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Notes on the Geography of Western Afghanistan. By Major WILLIAM ANDERSON, Bengal Artillery.

Any person attempting comparative Geography, soon learns how very little dependance is to be placed on the geographical written proper names of even the best classical authors; words evidently intended to be identical, may be traced through all possible forms of spelling, exhibiting any near approach to each other. It occasionally happens, that authors of no repute may from accidental circumstances have learnt the real correct form of a word, of which the most learned commentator has been entirely ignorant. The Greek and Latin geographical writings on Asia are chiefly composed by learned authors, in their closets, from laborious studying and reading of more ancient works of travel and of history; little discrimination was exercised over the various facts, in rejecting repetitions or in distinguishing between the same relation given, with only a few slight variations of circumstances; hence, the greater accumulation of error will be found in the latter authors, who often contain undigested all those mistakes to be found in previous writers. Very little dependance can be given to the names of places, distances, directions or bearings, in the relation of the movements of the soldier, merchant or mere traveller; they are often, I suspect generally, subsequently compiled from memory, than which nothing can be more treacherous or liable to err. Let any one attempt from mere recollection to recall any long line of marching; and he will often, very often find himself unable to determine with precision which places preceded each other in the route, although he may be able to give a very fair

general account of the whole line of march, and a particular version of many occurrences. The relation of time and order is not well remembered. Many intermediate points between two important ones are often entirely forgotten and omitted, or misplaced. Almost the whole of the details of the geography of Asia were obtained by the Greeks and Romans from the hearsay evidence of travellers and merchants; it was hence less to be relied upon as the distance explored was greater. It certainly was not the custom of earlier times, for merchants to make the venture of the entire line of traffic; the merchandize of Hindustan was carried by Indian merchants to Afghanistan; by the merchants of this country to Persia; and by the traders of this quarter to Syria or Egypt, and so on; the inhabitants of one end of this chain, received but a very confused and indistinct account of the proceedings of those at the other end. Yet much of the information so obtained, is now matter of geographical comparison. Let the confusion made in Asiatic names by Europeans of the last century be borne in mind and then we shall not be astonished at the little progress now made in tracing out the districts and nations of antiquity; the more so when we add the errors of copyists for 2000 years. Nor are we quite assured of the real measure of all the terms used for distance, time, weight, or motion.

The attempts to graft measured distances, or assumed travelled distances, on positions established by astronomical principles, is also a constant source of error; as little allowance is given for the reduction necessary to constitute a right line; or to the difference of the length of the degree under different latitudes. It is this last error which has carried out all places in central Asia, so far to the East of their proper position.*

The intermixture of systems has also caused endless trouble. The travels of one man are conceived in his mind, and perhaps so written down, on a certain scale, those of a second writer on a greater or a less scale, while a third person, attempting to combine the two on the idea of their being formed on an equal mental measure, would produce most erroneous results—it is this which transposes places on the maps. Also is to be remembered another constant but now untraceable error, confu-

* The error of a traveller being well established between some determined places, might enable his whole work to be reduced to an approach to fact.

sion in the meridians whence the longitude is to be measured.* From these and many other causes I believe the greatest license may be taken in fixing towns or districts or people, which are not firmly determined by more than one proof or argument.

The usually accepted measures are,

1.087 Greek stadii = 1 English furlong.

8.69 „ „ = 1 English mile.

125 Roman passi = 1 Greek stadium.

135.8 „ „ = 1 English furlong.

1.087 Roman Millia passuum 1 English mile.

These are founded on the passus being considered what in England would be called a double pace—or supposing the legs to be viewed as a pair of compasses; one foot fixed in the centre and the other describing a circle, the English pace is the radius, but the Roman passus the diameter.†

Again, are to be well distinguished the natural divisions of countries as indicated by rivers and mountains; the proper or acknowledged districts as marked out by long established boundaries; the political as held under the temporal power, constantly changing of different dynasties; this last is a grand source of error in eastern travels. For instance, we find Kundahar noted as a province of Persia, of Herat, of Seestan, of India, of Kabul and even of Cashmír. Language, religion, and productions, also afford a means for classification.

According to Pliny, the Geographers of the Alexandrian expedition,

* The first Meridian of Ptolemy is some point of the Canary Islands. Say W. 14°. Others consider the first Meridian to be some point of the Azores Say W. 24°. A difference of ten degrees, which we do exactly find to exist between some of the Arabian tables of Longitude. Others assume a western point of the mainland of Spain, and a few authors conceive the point to be a central town of Spain. Hence to mere map-makers the confusion.

† The Muhummadan measures are extremely variable and difficult to fix; the commonly accepted version is—

4000 Zurua = 1 Meel $\frac{3}{2}$ Zurua = 1 Guz khuyatee.

3 Meel = 1 Fursukh 8000 Guz = 1 Fursukh.

Assuming the Zurua = 21 inches.

The Guz = $31\frac{1}{2}$ inches.

The Fursukh = 3.97 British miles or 4.31 Roman miles.

The Arabian Meel = 1.32 English miles.

took a fresh departure from the Caspian Gates, and calculated 3000 stadü to Zariaspa, a city of Bactria, and 5000, more to the Jaxartes or modern Sehon ; distances measured no doubt along a high road and from ferry to ferry of the rivers. S. 18, C. 16, Book 6, says :—

“A Caspiis ad orientem versus regio est Apavortene dicta, et in ea, fertilitatis inclytæ locus, Dareium.” This I conclude to be the modern Aeverd, or Bavurd, the district round Kelat ; the birth place of Nadir ; near it our maps do place a *Dereguz*. Justin says, the first Arsaces founded this place, Dareium, among the mountains of Zapaortenon ; “Cujus loci ea conditio est, ut neque munitius quiquam esse neque amænius possit ; Ita enim, et præruptis rupibus cingitur, ut tutila loci nullis defensoribus egeat ; et soli circumjacentis tanta ubertas est, ut propriis opibus expleatur.”

Khojah Abdol Kureem, who accompanied Nadir on his return from the invasion of India, says :—“The town of Kelat is surrounded by high mountains so perpendicular as to be absolutely inaccessible ; on the side of Meru is a large gate where the guards examine every person who goes in or out ; this leads to a pass so narrow, as to admit only one horseman at a time, and over which the mountains meet at the top in a most astonishing manuer ; forming a natural arch. The canal upon which the cultivation of Kelat depends enters the town on the side of Mushud, and goes through the pass of Meru. Abiwurd is a populous town, it is also called Baward.” Kelat thus appears a very similar place to, if not identical with, Dareium ; and in Abeward or about Mushud, we have the centre or starting point of the Parthian nation,* a desideratum in ancient history. Next, to the eastward we may trace *Margiane* in the modern Moorgab. And in Merve-ol-rood, or Merve,† on the river, I have no doubt we may accept the city built by Alexander, destroyed by the barbarians and restored by Antiochus. Pliny uses the words “interfluente margo.” Isidor adds, “*Ἀντιοχεια ἡ καλοῦμενη ἐν ὕδροος,*” all pointing to the designation still maintained in “Merve-

* It is worthy of observation as a curiosity, the introduction by Justin of the letter Z as in Zapaortenon. This is as an example of the dependance to be placed on proper names. Our printed words have obtained a prescription of correctness to which perhaps they are all ill entitled.

† This second Merve has been placed by some writers, either on the banks or close to the Oxus ; and hence carried to the North of Merve Shahjuhan ; in place of being some 80 miles South-East of this place.

ol-rood." Orodes here carried his prisoners after the defeat of Crassus. From it, over the mountains of Caucasus existed, as at present, the road to BACTRIA, (Balkh :) Of the numerous tribes mentioned by Pliny, I can only speculate on *Ochani*, which may have reference to the Ooghans. The *Harmatotrophi* "qui curules equos alunt" as having some connection with Andakhoo or Muimoonuh, very celebrated marts for large Turkomanee horses.

CANDARI are the tribes of Kundahar. Paricani those of Furah. Sarangæ those of Zurung. The Gelæ, quos Græci Cadusios, appellaverunt, may be the modern Kords round Mushud, or the inhabitants of Ghoor. Heraclia built by Alexander, destroyed by the natives, restored by Antiochus, and called Achaida, looks very like the oft repeated history of Herat.

I am inclined to consider the Ochus and Oxus to be the same river under different modes of writing, a mistake created by the mal-location of Merve-ol-rood. The present stream of Bulkh, called the Bulkhab, is certainly not navigable, and its water does not in all seasons reach the Oxus.

The *Sariphi* mountains, dividing Aria from Margiana, are those round Surukhsh. The river *Jaxarte*, quod Scythæ *Silin* vocant; "has a very near approach to the modern term of Sehon. In seven days it was reported to Pliny goods could be carried from India (Kabul, its frontier) to the Icarum river of Bactria, flowing into the Oxus, and down that river into the Caspian, and hence be distributed over Asia Minor from the river Kur or Cyrus." No doubt goods might reach the Oxus in seven days from the top of the ranges, the frontier of India; the only real omission in this very general outline being the second land trip from Kheva to the Caspian. For in these mountainous districts there can hardly be rivers navigable for boats; their course is too rapid, their beds too rocky and the fall too great. I doubt if a boat exist in the country till the Oxus on the one side reaches the sandy deserts near Termez; or the Helmund on the other side debouches on the level flats of Gurmsail. But roads all lie along the beds of these streams, for the sake of water or of passage round the rocks,—hence a native going from Guznee to Kundahar invariably adds, "down the Turnuk," or "down the Argundab," without the slightest idea of the intervention of a boat. Icarum has a shade of the word Ghor, which

would thus be the stream passing Kunduz ; this process would occupy, as it does at present, the merchants, of four nations. The routes of merchandize depend chiefly on the safety of the roads and protection afforded by chiefs, as well as on the seasons ; my belief, nay my experience is, that mere traders are entirely ignorant of every thing beyond their own beat of trade. The Lohanee merchant of Guznee who brings the beautiful fruits of Kabul to the imperial city of Delhi, could give on his return home but a very imperfect account of how the same fruit reached the port of Calcutta, and so it was in the days Pliny wrote. The following are given by this author as the distances measured by Diognetus and Bæton, with the army of Alexander.

	Roman Miles.	Perhaps.
From the Caspian gates, to Hecatompylos, ..	133	
,, to Alexandria of Aria,	566	Herat.
,, to Prophthasia,	199	Furah ?
,, to Arachotiorum oppidum,	515	Kundahar.
,, to Orto spanum, trivium e Bactris,	250	Near Guznee.
,, to Alexandria sub-Caucasa,	50	Near Mydan.
,, to the river Copheta et oppidum Peucolaitin,	227	Peshawar.
,, to the Indus and Taxila,	60	Atock.
,, to the Hydaspes,	120	Jhelum.
,, to Hypasis,	29½.	[Either this river is intended for the Accines, or as I find some one has indicated by a pencil note in the Asiatic Society's copy of Pliny, that CL. have fallen out from the CLXXIX. in the distance of 179 miles.]

The name Imaus, *Hemálaja*, in the language of the natives signified "*Nivosum*," or covered with snow.

Having worked round the coast of India Pliny returns up the Indus, to the Peucolaitæ, Arsagalitæ, Geretæ, Asoi ; the former of whom are identified in *Pukulee*, and the last may be the modern *Esa* nation ; for no less a term than nation will describe the present *Esa* Khuel. Four provinces are then mentioned which were by some considered as Indian, by some made Persian.

Mountains surrounded the districts next the Indus river. One province was called Capissene—had a capital Capissa, *καπισσα*, also written Caphusa ; this capital was destroyed by Cyrus. The city and district

had clearly the same name. I am inclined to assume that Capis and Kabul are intended to represent the same word.

Another of these four provinces is Arachosia, with a capital and river of the same name; which last some considered to be the river indicated by the term Cophen. The town was built by Semiramide.

The river Erymanthus flowed past Parabesten of the Arachotii.*

To the South of the Arachotii was the third Province of Gedrosia; probably round the modern Kedje. To the north was the fourth of the Parapamisadæ. In this last district, there is mention made of a city called *Cartana*, under the mount Caucasus; afterwards called *Tetragonis*. Also of Alexandria in Bactria, and of another city of this name under Caucasus. Tribes are called Syndraei, Dangalæ, Parapiani, Cantæes, Maci.

Cartana has a trace of referenee to the Ghor of Ghorbund, and Charikar may have relation to *Tetragonis*; Parapiani has been considered to exhibit a vestige of Hupian, north of Estalif.

If the Par, Por, Boor may be thus relinquished, I would propose Bamean as a type of Pamisus or Bamis; we might almost fancy the range of Para Khoaltrus being but Kohulturusuh or Mount *Taurus*! so Para Pamisus; and assuredly in Arabic or Persian باسسان and باعديان would be hardly distinguishable.

Huree, *Aria*; Eeran, *Ariana*, are often confounded together; in regard of the former Pliny mentions; cities Artaeoana and Alexandria on the Arius; the river being clearly the Huree rood, also Artaebane restored by Antiochus.

A people are called Dorisei.

One river is named Pharnaetis, and a second Ophradus, probably the *Furah* rood; Prophthasia is given as a city of Zurung, hence of Seestan.

With respect to the ranges of mountains, Caueasus, КОИ-KOSH is used as a term for the whole; Paropanisus or Paropamisus, for those towering above Kundahar and Guznee. The Emodus constitutes the

* This is clearly the modern Best, the prefix *Para* may be a misreading, or may be but the word Poor or Boor, used for city, as the "town of Best." It might be well known that there was both a capital and a river in the district of Arachotia, although their proper names were unrecorded. Arabian authors all attribute the foundation of Kundahar to a queen of Arabia, perhaps Assyria, called Bulkees.

Northern, and Imaus the Eastern and Southern branch of the grand Hemálayan chain. The whole of Pliny's references to these parts bear the appearance of an assemblage in a common-place book of all that could be found relating to them in other works.

Mistaking places of the same or nearly the same name, but of entirely different locality, has led to much confusion, of which the following appears to me an instance. "On the borders of Bactria, conterminous with India, is the district of Choarene, the nearest country to India occupied by the Parthians; according to Strabo it is 1900 stadii from Ariana, and yet he says Craterus marched through it on his way from India, to the country of the Arachoti, which would bring it within the limits of Ariana itself. The statements are clearly incompatible, and it is not easy to conjecture a situation for a province of which no other notice occurs." Such is an extract from Wilson's Ariana. But if we accept Bactria for *Bakhtur*, as considered by Moslem authors; including Gurmsail and the countries N. W. of the Helmund, and read Kharan for Choarene, we have a province which shall fulfill all these required conditions.

The Nuzuhut-ol-Kuloob of Humdallah Kuzweenee, gives the following routes and distances:—

Rue

Dure ameen,.. 6 The Wurameen of maps—once a large town of Rue.
The Dur may have reference to Pylæ.

Khawur, 12

Ras-al-Kulb,.. 12

Semnan, 10

Damghan, .. 20 Supposed to be Hecatompylos.

Bostam, 13

Jajurum, 23

Neshapore, .. 42

Boocheگان, .. 38

Herat. 30

Polybius says Hecatomphilos takes its name, "for that all the passages of the neighbouring countries join there;" now Humdallah makes two roads from Khorasan unite near Damghan; but from Bostam he carries off the grand northern road to Kharism, which is more in the sense of Polybius. From Bostam to Herat is 133 Fursukhs \times 4.25 =

566 Roman miles ; from Semnan to Bostam is 33 Fursukhs \times 4.25 = 140 Roman miles, to meet Pliny's 133.

To cover the distance of 199 Roman miles to Prophthasea, we have the distance measured by the British Embassy from Herat to Sheheruk, on the Furah road, of 131 British miles, with 20 more to reach the old city of Furah ; and as this was the very shortest cut for a small party, we may grant that the large Army of Alexander, marching with the waters, would have covered 183 British miles, or 199 Roman miles to near this spot,—I believe a numerous party would go round the range to the south of the city of Herat.

The 515 Roman miles to Khundahar is not so easily established ; but I believe Alexander, in taking the city or capital of the Zurungæ of Seestan, to have marched round the lake of Seestan and up the Helmund to Best, and thence to Kundahar.

An intelligent sergeant of sappers fixed the Fort of Joween in Lat. $31^{\circ} 31' 56''$. The Latitude given for Zurung by most Arabian and Persian authors is $30^{\circ} 30'$.

The distances will then stand :—

Furah to Joween,.....	20	.....	20
Zurung,	44	.....	44
Direct over the desert to Ghereesh, 118 ; if by the			
banks of the			
Helmund			186
To Kundahar,	75	.....	75
		<hr/>	<hr/>
Total,	257		325

Hence there is a deficiency of 190 miles to make up the 515 of Pliny. It is not impossible that this may be an error ; and it is strange that in the last distances of his route, from the Hydaspes to the Hypasis, we find an apparent omission of 150 ; the grand total being nearly correct.

In the Geography of Moses of Chorenene, written in the Armenian language in the fifth century, and translated into Latin in 1736, we find a list of the districts forming many countries of the East ; and from them we might expect names obtaining previous to the Moslem conquests ; but alas ! the nearest approach to most of them are not satisfactory ; but

as it often happens that a second reader may hit on a word which has escaped the search of a previous one, therefore I have copied the names, although the authenticity of the work is doubtful.

Persia is called Chuste Ncemroz, touching the eastern border of Chuzastan, and the confines of Media ; containing twenty Provinces.

Pers <i>idem.</i>	Pars.
Aspahan <i>iam.</i>	Esfuhan.
Mesun <i>iam.</i>	Mazunderan ?
Hacar <i>iam.</i>	
Panat <i>iam.</i>	
Cerman <i>iam.</i>	Kerman.
Curan <i>iam.</i>	Kharan.
Macuran <i>iam.</i>	Makaran.
Send <i>am.</i>	Scinde, lower.
Hend <i>am.</i>	Hind ; round Ser-Hind.
Meran <i>am.</i>	Mehran ; banks of the Indus, upper Scinde.
Petvastan <i>iam.</i>	Punjabistan.
Segastan <i>iam.</i>	Segestan.
Aplastan <i>iam.</i>	Afghanistan ?
Deram.	Delum, in the Persian Gulf.
Melam.	Malia.
Mahie <i>iam.</i>	Mahie, of Cambay.
Maun <i>iam.</i>	Mandavie, a place of considerable trade.
Chozerhastan <i>iam.</i>	Khezeristan.

Palham.

Ebuham.

Rhesira Parhasania. Producing the best Pearls. Bahrien.

Aria, is called Chuste Chorasania ; lying between Media, Persia, the Caspian and India.

Comis <i>ia.</i>	Comis.
Hyrcan <i>ia.</i>	Goorgan, Hoorkan.
Apersaria.	Abewurd ?
Meru <i>ma.</i>	Merve.
Arovastia.	Arachotia ? Hureeswatia ? Kundahar ?
Rheucatesania.	
Nestimanaca.	
Beznia.	Boozjan, near Jam ?

Salcan <i>ia.</i>	Talkan.
Docan <i>ia.</i>	Damghan ?
Anaplia.	
Heru <i>ma.</i>	Huree ; Herat.
Zambyr <i>us.</i>	Subzwar ?
Naxeria.	Neeshapoor ?
Dezina.	Zoozen.
Avazachia.	
Varzania.	Beerjun ?
Mansania.	Muzeenan ?
Zaxtana.	Kohestan ?
Bahlia que et Parthia.	Balkh.
Domatia.	Dumadutha ; Dumadoot : or Deemut of Dumawund.
Larimanacia.	
Siria.	Saree ?
Baricania.	
Dobonia.	

Scythia is called Apachtaria, *Bactria*, and *Turchia*, extending from the Volga to the Himalaya, even unto *Zenia*, *China* ; it is inhabited by many nations, among them the Sogii, Thoearii, and Hepthalii.

Moses Chorenensis is considered to have written his history and his geography in the fifth century. It is clear, that he had consulted the works of Ptolemy and other Grecian as well as Latin authors,—but whether his Persian and Asian Geography is based on European or Eastern authority, is a question of interest to be decided. Perhaps other readers may hit on better identifications of the names than those I have given, and may add to the list. The time has reference to the reign of the great Buhram, of Persia, for whom Moslem authors claim extensive conquests in India, embracing Scinde, the Punjab, and the N. W. provinces of India round Sirhind. This last always appears to me as the districts indicated by the word Hind. If *Aplastaniam* is *Afghanistan*, this date destroys all the fanciful etymology of the Persians for the word, and certainly its position between *Segistan* and various ports on the sea coast, warrants the assumption.

And if *Maunia* be *Mandavee*, the conquests of the Persian kings by means of their ships were more extensive than is usually supposed.

From the intimate connection between Armenia and Persia we may fairly grant a distinguished scholar of the former country might have obtained a correct account of the names of the larger districts of the latter country, but whether the words are attempts to write spoken terms, or are transcripts in Armenian of originals in Zund Puhluvee, or Duree, is a question to be determined by those who have the knowledge and means. There runs an apparent analogy through the words, which warrants something better than mere spoken corruptions.

The Armenians interchange D with T; B with V, and add an initial A.

The author would no doubt be in terms of friendly communication with the various Nestorian Christians scattered through Persia; and from them obtain information; thus Domatia, Dumadutha is recorded by the Nestorians as the seat of a bishop of their faith.

The next link in the geographical chain which is accessible to me, lies in the Persian works on this subject, or English translations from the Arabic; for alas! the original works are not procurable.

In a country where the revenue is almost entirely obtained from a tax on the various produces of the soil; where with few exceptions the land and the water are considered as the property of the superior power, to be by it distributed, under reservation of portions almost reudered fixed and permanent by time and prescription, in such a country almost every fertile spot, every well-watered acre of land, is known perfectly by the durbar of the local authorities, and generally, though less minutely by the grand officers of the capital. Such lands are marked out as prizes to be obtained in jageers by the courtiers. A much greater amount of such statistical knowledge did exist in the revenue offices of the East, than it is usual to suppose. These offices could tell to a fraction, the names, area and production, of a particular place, although entirely ignorant of any data to position obtainable from Longitude or Latitude—the situations as known to them being determined by very general bearings from some capital, and the usual marches for travellers—or for revenue collectors. Thus if we examine any particular history of a place, Herat, for instance, we find recorded all the fertile spots, all the well filled canals, all the pretty villages; their extent and fruits; with the various places of pilgrimage, and all the wonderful productions of nature in hot springs, caverns, or

rocks, and last, but not least, the names of all learned or religious men to which the spot has given birth. All such are fully recorded, and had time spared sufficient particular histories, I believe a most complete general map could be produced.

Moslem authors do not forge facts of science, though they often misunderstand and misrepresent them; and taking too much for granted, do not sufficiently distinguish and examine ere using the statements of others. More attention is paid to embellish a fact with words, tropes and epithets, than to examine the correctness of the fact, or its bearing to the subject under discussion.

I believe the names of places do not change to the extent supposed; and that more is traceable to the mistakes of copyists and of readers, and to modern forcing of names, to suit particular theories.

We must also bear in mind, that the seat of the supreme authority has been so often removed, that there is hardly a district in the capital of which the dominant power over Southern and Western Asia has not resided. From Mecca it has advanced to Kofa, Baghdad, Merve, Bokhara, Sumurkund, thence retraced its steps to Khewa, Guznee, Seestan, Herat, Ardewan, Demascus, and Constantinople. Even Kara Korum, in Chinese Tartary has been the residence of a mighty chief, whose sway extended over the whole of Asia; while Abewurd, Balkh, and even Kundahar, are not without their claims to be considered as royal residences. Hence in the various histories of these places, now lost, I have no doubt could be traced ample means to fill up all the blanks in all our modern maps.

The professed works on Geography, in which recourse has been taken to determine the positions of places by the means of latitude and longitude, are many, and of two distinct classes; the first class embraces those of which the authors were both travellers and men of science, who could determine their own position at any period by rules of science, and reduce other neighbouring places to a fairly correct position, such I have no doubt were Ebne Huokul and Aboo Rehan; both celebrated authorities on geography, whose original works would prove treasures of great value; Although their absolute longitudes and latitudes are not very correct, when compared with the scientific calculations of modern days, still they were close approximations in the case of the latitude, to the truth,—sufficiently near to answer all the required

purpose. The longitudes are all far more remote from reality, and when extended over a long space, are nearly valueless; still when the authors have been in person on the spots, the *differences* of both latitude and of longitude will be found nearly correct enough to determine the position of places at no great distance from each other. Thus would I give much weight to differences of bearings of places from Guznee, as a first meridian, when quoted from Aboo Rehan.

The second class, is that of historians and the framers of geographical dictionaries, who compile books from the labours of the first class. These form systems of their own, under which they endeavour in their studies to reduce the discoveries of others.

Some form lists according to the letters of the alphabet; others according to the climates, and into these they insist on introducing all that can be found written by those who have preceded. No discrimination is used to discover either the correct reading of the written words, the proper position of the vowels and marks, the undoubted letters of the Abjud numeration giving the latitudes and longitudes, or lastly, the credit due to the authority; and thus the more modern the author, the greater chance he has of containing the accumulation of all the errors on these points committed by his predecessors. Of the errors of the kind of not correctly reading the words, I can give an excellent example; and a proof of how little dependance is to be placed on these written proper names.

Sir William Ouseley's translation, of what he considers Ebne Huokul, contains a list of the rivers of Herat, being in reality the various canals branching from the Huree rood, and watering the cultivation as far as certain villages on their banks of which the name of the most distant or principal is given; these canals are 3 to 4 feet wide, and deep according to circumstances. Edresee contains a similar list; and though I have no doubt in my own mind that the type of both is identical, yet hardly two words are now the same, and hardly one correct; all this results from constant re-copying, and such is the worth of the labours of some of our best orientalisists, and probably occidentalists.

Villages, as corrected by modern works and evidence.	Canals, as corrected from several modern works and evidence of natives.	Names of the villages as written in Ebne Huokul.	Names of the villages as written in Edresee.	Names of the Canals in Sir Wm. Ouseley's translation of Ebne Huokul.	Names of the Canals as written in the printed copy of Edresee.
	پروانه و هوا دشتک	سپیداسنک	سنداسنته	پرخوي	و حري
کرازان	آلنجان	سپرشيدان	سوسان	اردنجان	ارست
بغني	غوروان وپا شتان	ورين	شعلته	نسکوکان	شکوکان
کواسان	کداره	کراسان و شيا و شان	کورکان		کواع
	خيابان		کرک		غوسپجان
	که بواق	کریکرعريان	کرنکروغزنان	کبک	کذک
	سبقر	پوشنک	سرخس و پشنک	سعوکي	شيدغر
	انچیل	هرات	مدینه هرات	خهرکي	جیر

A very slight knowledge of Persian will show how easily these words may be corrupted in writing and copying. When the word *nehr* is used for canal, the authority is Arabic; when the term *Bulook* is used, the source will be *Toorkee*.

In matters of mistake, regarding the value of the *Abjud* numeration, any common table of latitudes has only to be opened to prove that they are endless.

For instance, in the tables of *Abol Fedae*, regarding *Khorasan*, No. 11, is placed between *Zoozun* of *Kohestan*, and *Khurjurd* of *Herat*. (*Khosh-*

ruo jurd خشروخورد,) a place called Khoost of Bulkh, said to be between Indurab and Tokharestan; and it is so placed because the ص of the Long. = to 90° , has been read و = 80, and the ح of the Lat. = 8° , has been read ج = 3° ; thus it stands:—

Khoost, Long. 83—47; Lat. 33—20; but should be, I think,
 ————— 93—47; — 38

Even with the correct description in the printed text the errors have not been noticed.

The geographical work known by the name of Ebne Huokul, is said to exist in the library of Leyden, in the original Arabic; Sir William Ouseley has given to the world a translation from a Persian work on geography, which he considers to have been made into this language from the original Arabic of Ebne Huokul; and certainly, if not a direct translation, the identity of the passages would warrant the Persian work being considered as a compilation from the Arabic. No particulars of the author appear known; but Sir William Ouseley considers the work may bear date between A. D. 902 and 968. The notices of Persia (Fars), are so much more complete in detail of districts, rivers, capitals, tribes, families, and even proper names and characters of persons, as to sanction the idea of Ebne Huokul being a native of that province, or perhaps of Arabian Eerak, therefore his accounts of these portions of the east are more to be depended upon. He traces Mavaolnuhr, as a visitor or traveller would do, while his remarks are full, though not complete on the route of Kerman, Seestan and Merve, lying between Fars and Bokhara. This last city he must have visited in the days of Nooh bin Nusr, the 4th of the Samanian dynasty of Bokhara. Tables called Utwal and Urooz, bear the name of Ebne Hookul; but a work called Momalek and Musalek—the name of that translated by Sir W. Ouseley—is by natives attributed to Uhmud bin Abu Yakoob Ulkateb.

Abou Rchan, a native of Beroon in Kharism, spent many years in travel, and was ultimately employed by his king, Mamoon of Kharism, as an agent at the court of Guznee, during the reigns of Muhmood and Masood. He was one of the most subtle and clever men of his age, and passed for a magician; his geographical work is called the Kanoon ul Masoode, and with reference to the place in which it is written should be good authority in matters connected with Afghanistan, at the period from 1000 to 1050 of Christ.

A writer on geography is also constantly quoted as Ebne Sued, of whom little appears known. D'Herbelot adds, that his name was Othman, and that the title of his book was *Ketab olmoccenna*. This author is chiefly known as being an authority of Abool Fedae.

The work of Edresee compiled in the year 1154, for Roger, king of Naples, by Aboo Abdallah Mohummud, should be of authority and weight in questions connected with the Mediterranean, Egypt, the coast of Africa, and perhaps the interior of Asia Minor or Syria.

Abool Fedae, Esmael bin Nusr, Prince of Hamah, in Syria, flourishes as a royal author of a work on geography in the Arabic language. He died in the year A. D. 1331; his work is entitled *Tukweem ul Buladan*, and with reference to the country where written, it should have more weight in questions connected with Asia Minor and Syria, than in relation to those at any great distance from his native place.

It is a strange circumstance, and worthy of note, that Kundahar, as a term for a capital, or even district, is not to be traced in the geographical works of common use as connected with the country, to which it is now applied. This fact has created some astonishment; so much so that Professor Wilson is inclined to consider the name of modern origin.

Thus, if we consider the book translated by Sir Wm. Ouseley to be the work of Ebne Huokul, we find not the word Kundahar where it should be looked for, in the direct road from Best on the Helmund, to Guznee; but in the spot now occupied by Kundahar we find Shuhre Rukhuj, being the capital of Arachotia. It may be questioned which is the archtype on these two words, and which the corruption. But we are to bear in mind that this work of Momalek and Mosalek, is not proved to be the book of Ebne Huokul; that a work under this title is attributed to another author, viz. Uhmud bin Abce Yakoob.

In the work of Edresee, in the same situation, between Best and Guznee, we trace this identical route, with a few intermediate stations added; giving Rukhuj and Punjwae as occupying the position of modern Kundahar, set forth in the 7th section of the *third* climate. Hence, here we are disappointed in finding the name of the district, although, as we shall show hereafter, names are given of places close to the old city of Kundahar. This to a casual observer would be almost conclusive, that the city, or its name was of date subsequent to the

work of Edresee. But on a little closer examination what can be traced? Why, in the 8th section of the *second* climate we find—

“Candahar est une ville considérable et très peuplée; Les habitants sont remarquables par la manière dont ils laissent croître leur barbe, qui leur descend jusqu'aux genoux; et qui est large et très touffue, ce qui a donné lieu à une façon de parler proverbiale; Leur figure est ronde, ils portent le costume turk Le pays produit du blé, du riz, diverses céréales, des moutons et des bœufs. Ils mangent les moutons morts naturellement, mais jamais de bœufs, comme nous l'avons dit plus haut. De Candahar à Nahrawara on compte 5 journées en chariot “Les peuples de Candahar sont souvent en guerre avec ceux de Kaboul” laquelle est une ville indienne voisine du Tokharestan grand et bien bâtie. Ses montagnes produisent du bois d'aloës excellent, et ses environs des noix de coco et des myrobolans de l'espèce qui tire son nom (Kabouli) de celui de cette ville, et qui croît dans les montagnes. “Dans les lieux bas, on sème des bulbes de safran en quantité, et cette substance devient l'objet d'un commerce d'exportation considérable. C'est un objet d'un produit éventuel qui dépend de l'état de l'atmosphère. La ville de Candahar est défendue par une citadelle très forte, située sur un rocher escarpé qui n'est accessible que par un seul chemin elle est habitée par des Musulmans: il y a un quartier dont la population est juive infidèle. Aucun roi ne peut prendre le titre de chah, si ce n'est après avoir été inauguré à Kaboul. En vertu d'une ancienne loi, la prise de possession du pouvoir a lieu dans cette ville, où l'on accourt des pays étrangers de très loin. Dans les terres fertiles du pays de Kaboul on cultive beaucoup d'indigo de qualité supérieure à toute autre, et qui, par ce motif est très renommé et fait l'objet d'un grand commerce. On y fabrique aussi quantité d'étoffes de coton qui s'exportent en Chine, dans le Khorasan et dans le Sind.” Il y a dans les montagnes de Kaboul des mines de fer très connues, le métal est d'une couleur grise marbrée, devient très tranchant, — — — This we find dragged into a chapter, section and climate evidently confined to Scinde and India.

Now the town here described was of India; the inhabitants were *not* Turks, though wearing their dress,—the produce was rice, and the people would not eat beef, and the distances were measured in journies by carriages,—all circumstances of India; yet the people were constantly

at war with those of Kabul, a city of Tokharestan, and were at times under the king of this Kabul. Hence these latter circumstances are those of the present Kundahar of Afghanistan, of which at that period the inhabitants were Turks, the produce hardly any rice, beef consumed, while such a thing as a wheel carriage was never heard of in this mountainous country. In fact, a wretched mixture has been made of two descriptions obtained from other authors; one of Kundhar, a city of Baroach, in Guzcrat, of which country, the capital, Anhulpoor, was subsequently called Nehrwalah, according to the Ayeen Ukbaree and of which as near the sea coast, the accounts must have been known to the Arabs, and of the description of Kundahar near Kabul of Afghanistan. Thus having disposed of both these places in the 8th section of the *second* climate, Edresee finds himself at a loss when he reaches the correct position of the second in the *third* climate, so blinks the question, and mentions a capital or a city of Arachotia; From Guznee he is forced by propinquity to enter again upon the subject of Kabul, which is done in a hesitating mode; though the circumstances of the coronation again mentioned, prove this town, now introduced in the 3rd, to be identical with that already mentioned in the 2nd climate. This is the great error of all compilations not distinguishing between places under the same name. It is also a very curious fact that in this quotation by Edresee we find the inhabitants of Kabul are mentioned as *Jews*, and this too by an Arabian author, who would be versed in the genealogies of his country.

If we proceed to Aboolfeda we trace the same error of compilation. Rukhuj is given as a district of Segestan, of which a town was Punjwæe, on the authority of Ebne Huokul;—and on the authority of the Kanoon, it is attributed to Lat. $32^{\circ} 50'$; Long. 93° , in the third climate; while in the table of places in Hind, of which all the rest are called of the latitudes of the twenties, and in the second climate, we find a place designated Wechund, a town of Kundahar, with Lat. 33° ; Long. $94^{\circ} 50'$, and the third climate, on the borders of the desert of Scinde on the authority of Kanoon; almost identical with the above fixings of Rukhuj by the same author. Ebne Sæed considered it one of the seventeen Alexandrias built by the Macedonian conqueror; The error of Edresee in regard of Nuhrwaluh just mentioned, is also brought forward. I have no doubt but that Wechund, *ويهند* is a clerical mistake for Punjwæe *پنجواي*, a town which now exists some 12 miles west of the old city of Kundahar.

In the hope of arriving at some facts, in the matter of the recorded latitudes and longitudes. I tabulated all I could collect of two such celebrated places as Herat and Guznee. The Red book MSS. is so carefully written by the hand of some man versed in the science of figures, that I consider the readings to be correct, all the others being from printed works are doubtful.

<i>Herat.</i>	<i>Latitude.</i>		<i>Longitude.</i>				
	°	'	°	'			
Ayeen Akbaree, ..	34	30	94	20	} 94° 25'		
Sadek Esfuhanee,	34	30	94	30			
Utwal,	35	0	85	30	} 86 55 7° 30'		
Ebne Sued,.....	35	30	87	30			
Red book, a MS.	34	0	87	45			
Major Sanders, ..	34	21' 27	62	07			
<i>Kundahar.</i>							
Ayeen Akbarec, ..	33	0	101	15	} Tungee-abad,*	} 101 02	
Sadek Esfuhanee,	33	30	100	50			
Kanoon,	33	20	93	0	} Rukhuj	} 92 50-8 12	
Red book,	33	40	92	40			
Major Anderson,..	31	36' 10	65	53			
<i>Guznee.</i>							
Ayeen Ukbaree, ..	33	26	104	20	} 103 35		
Sadek,	33	30	102	50			
Utwal and Kanoon,	33	35	94	20	} 94 22 9° 13'		
Red book,	33	30	94	25			
Engineers of the army,	33	33' 54	68	15			Wyld's Map.
<i>Kabul.</i>							
Ayeen Akbaree, ..	34	30	104	40	} 104 24		
Sadek,	34	30	104	08			
Utwal,	34	30	94	40	} 94 30 9 54		
Kanoon,	33	45	94	20			
Engineers of the army,	34	30' 18	0 69	0			Wyld's Map.

The above table I believe to contain the quantities intended by the respective authorities whence extracted. Now Herat and Guznee have both been emporiums of science and astronomy and astrology,—the former under Arab, Tork and Mogul dynasties,—the latter under the Guzneevid race of Muhmood; and at its capital must have been calculated the Kanoon-e-Masoode of Aboo Rehan. Hence, as far as their rules of science and art would carry, we may conclude the position of these two places to be exactly fixed. The latitude of Herat differs

* Or, the capital of a chief of these parts, Teghe, who flourished in the days of Subuktugeen.

but a few miles from that established by Major Sanders; while the latitude of Guznee is identical with that ascertained by the Engineers of the army of Kabul; proving that these Moslem geographers could fix the latitude with precision. In the matter of the longitudes, we may notice that those of the Ayeen and Sadek commence from a first Meridian, distant 10° west of that used by the other authorities. Now the difference of longitude between the Peak of Teneriffe, $16^{\circ} 39'$, and some of the Capes on the West Coast of Africa, say Cape Spartel, $5^{\circ} 54'$, is about 10° . Again the differences of longitude stand thus between Herat and Guznee:—

	Long.	Difference.	
Herat Ayeen Tables,	$94^{\circ} 20'$		
Guznee Ditto ditto,	$104 40$	$10 20$	} 9 45
Herat Utwal ditto,	$85 30$		
Guznee Ditto ditto,	$94 40$	$9 10$	
Herat English ditto,	$62 07$		
Guznee Ditto ditto,	$68 15$	$6 08$	

And I believe the difference between $6^{\circ} 8'$ and $9^{\circ} 45'$ or one-third, may be safely allowed as the error of equation to the equatorial mile for distances estimated by marching or travelling, but also included in it, the windings of roads, ups and downs of mountains, &c.

Kundahar is placed 2 degrees to the north of its correct position; whence I infer, it is fixed, not by actual observation, but by the estimated bearings and distance of marching between Herat and Guznee. Indeed the inhabitants of Kundahar appear always to have been considered a wild savage race, to be avoided. Until the days of Uhmud Shah Dorranee it was never the capital of an empire. I conceive, if the correct readings can be obtained, that with the equation above noticed for longitude, differences of latitude and longitude, when not large, may both be relied upon; but the greatest difficulty lies in the obtaining the correct reading of the Abjud numeration.

The following memoral words contain these letters in succession of their value in number, Abjud, Huowuz, Huttee Kulmun Suafuz Kurshut, Thukhuj Zuzhugh. Comparing this numerical scale with that of the Greek or any other language, may point to a correspondence between the written characters of the two nations. Both the epsilon and the eta of the Greek correspond with the aspirate of the Persian.

Value.	Persian alphabet.	Greek alphabet.	Hebrew alphabet.
1	۱	α	א
2	۲	β	ב
3	۳	γ	ג
4	۴	δ	ד
5	۵	ε	ה
6	۶	ς	ו
7	۷	ζ	ז
8	۸	η	ח
9	۹	θ	ט
10	۱۰	ι	י
20	۲۰	κ	כ
30	۳۰	λ	ל
40	۴۰	μ	מ
50	۵۰	ν	נ
60	۶۰	ξ	ס
70	۷۰	ο	ש
80	۸۰	π	ז
90	۹۰		ח
100	۱۰۰	ρ	צ
200	۲۰۰	σ	ק
300	۳۰۰	τ	ר
400	۴۰۰	υ	ש
500	۵۰۰	φ	ת
600	۶۰۰	χ	
700	۷۰۰	ψ	
800	۸۰۰	ω	
900	۹۰۰		
1000	۱۰۰۰		

These letters are thus combined :—

33= لچ

38= لچ

1345= ۱۳۴۵ ατμε

5010= ۵۰۱۰ ει

135000= ۱۳۵۰۰۰ ακε

In the Persian the highest number of each division comes first, and the divisions in the same order. A mark below the letter in the Greek indicates the division of thousands.

Now it is evident, that many of these letters are the same in form and depend on their diacritical marks for their correct value. But, alas !

in any but the most careful writing these marks are omitted, and much confusion has resulted. In the common forms of hurried writing, the ذ و ؤ ز are undistinguishable:— ج and ح for 3 and 8 are entirely at the mercy of the points. Indeed, unless in a work copied by a scientific arithmetician, it is first necessary to ascertain the probable place of the figure ere this numeration can be used with any chance of success.

Native authors give a few rules—for instance, to ج jeem for 3; the tail is never drawn round, and it is thus written (7) to distinguish it from ح hee, for 8; viz. 7, 3; ح 8,—but copiers never attend to this rule, and in almost every printed table I have examined, I find three and eight used at pleasure. Next it is ordered to distinguish و noon, for 50; from ز zee, for 7,—that a twist in front be added to the former, thus; و , 50, ز , 7. While the yee ع for 10, is usually to be carried to the rear, thus ع 10. How little confidence is to be given to manuscripts copied for sale may thus be supposed.

The rule for determining the latitude is the same as that used by moderns—the application of the declination to the zenith distance; but with no allowance for parallax or refraction. As regards the longitude we are informed by the Ayeen Akbaree, that it may be settled by watching the difference of local times, at which takes place some natural phenomenon, as an eclipse of the sun or moon; but how the exact local time of one place was to be transferred to another situation, is not given. I fancy therefore, that this important calculation was rather determined by estimated or even measured distances along high roads.

MOSLEM HISTORY OF HERAT.—The first account of the early rise of Herat runs thus,—“That when Tuhmoorus exalted himself as a God before the people, and introduced into the world every species of cruelty, some tribes of Kundahar wandered from Kabul to Ghoor and settled at Oobah. The violation of a virgin led to a disagreement, under which a portion migrated to Koowashan, on the present Malan canal, where at length a lady, called Shumeeruh, of the race of Kueomuruth, became Queen, in the days of Heyatuluh domination over the country. The fort built by her was much improved by a chief called *Khurnoosh*, in the days of Moses, about 1830 years before the Hejree, or some 1200 B. C. Again, in the days of Bahmun, a chief called *Urghanoosh*, enlarged the city of Shumeeruh, and as the inhabitants were now Christians, each bastion was surmounted with a cross!! this

event took place about 360 years before the Hcjee, soon after the departure of Christ from the earth.

The second account makes Shumeran to be called after a daughter of Bahmun, a king of Persia. Her name being also Homaec chehrazad ; and that Dara bin Dara had commenced the works of Herat, which after his death were completed by Alexander the Great ; but Eshk the Arsak exerted himself to remove every mark of this conqueror, even to changing the turns of the roads under the gates.

The third account gives the honor of the foundation of Herat to a daughter of Zohak, at a period when a Prince called Jooghun, of the race of Kue Kaoos, was settled in Badgheesh.

The fourth and most curious account is as follows :—

Alexander finding his country much distressed by the constant inroads of the *TORKS*, obtained leave from his mother to proceed to the frontier and build the city of Herat, on condition, that he did not remain absent more than one year. During the progress of the work, the people of Kohndez remonstrated against the building of so strong a post. Alexander wrote for the advice of his mother ; she ordered her son to send up to the capital some of the soil from the foundation of the new city, which she in secret placed under the carpet of her council chamber.

Then she assembled her *Roman* councillors who all gave different opinions,—she requested them to retire and to pause over their opinion and to return next day,—during which she removed the earth of her son's new city, from under the carpets. On the following morning the councillors all agreed that it was quite correct and advisable to build the new city. The mother therefore wrote to her son to carry out his own plans and intentions, as the qualities of the soil of Kohndez went to prove its inhabitants were of vacillating disposition and not likely to enforce their opinion, so Herat was built by Alexander.

The fifth account makes Alexander to find in a box an account of the first building of Herat by *Christians*, according to the plan of which he restored the city. The sixth account makes Herat to be founded by Alexander Zowelkornuen mentioned in the Koran. The seventh account is compounded of the former statements, that Seyawosh, Dara and Alexander each built portions of the walls.

Many other versions are given : one Shaikh declaring that the pro-

phet Khezer appeared and told him "the spot on which now stood the bazars of Herat, where the good and bad were contending for the things of this world, was once a sea, and that the fort was based on a rock against which endless ships had been wrecked."

I have known learned men without number throw down this account as utter nonsense, from the apparent anachronisms contained in it. The migration of the Kundahar tribes is recorded by Khondumeer as taking place in the reign of Kobad, during the excesses of the Manichæun fanatics, about A. D. 490. But the appearance of the name **Kobad** has given a reason for carrying back the account to the ancient **Kueanian** king, who flourished in the mythological periods of Persian history.

The most curious account is the fourth, and one which forms a basis for most of the other statements, and is a key to much similar Persian and Arabic history.

The fact is, this account is of a far different and very distant place, viz. *Heeruh*, one of the seven cities of *Urak*, some two *Fursukhs* from *Koofuh*. This I hit upon by finding the *Kusre Khuwurnuk* of *Heeruh* of *Urak*, also located by some authors in *Herat* of *Khorasan*. The work translated by Sir Wm. Ouseley contains the following:— "Kadseyuh, *Heeruh* and *Khuwurnuk* are situated on the skirts of the desert towards the west—the river *Euphrates* running by them on the east * * * *Heeruh* is an ancient city and large, but when *Cufa* was built *Heeruh* was drained of its inhabitants. *Heeruh* enjoys a pure air, and is one *farsang* distant from *Cufa*."

Now we know that *Alexander Severus* was for some time employed on this frontier against the *Arsakian* king, and subsequently against the founder of the *Sasanian* dynasty—*Ardashur*. Hence near some older fort or *Kohundez*, he may have built a new city called *Heeruh*, or re-embellished an old one of this name. We have it recorded that he was entirely under the authority of his mother *Mammæa*, without consulting whom he never undertook any enterprize of importance.

Herodian mentions the influence of the mother on the excellent disposition of the son; that he ruled the Roman world for thirteen years, when the Persians crossed the *Tigris* and commenced to ravage *Mesopotamia*. A large Roman army was destroyed from the non appearance of the emperor with his division; some attributed this to cowardice:

and others to his being overruled in the affair by Mammæa. This influence of the mother was turned against the son by Maximine, his murderer and successor, who urged on the soldiers "to abandon a wretched woman and that easily dispirited boy who could truckle so tamely to a mother's tyranny."

These coincidences of character will warrant the assumption, that the Alexander mentioned is not the Macedonian conqueror, but the Roman Alexander Severus, and the identifying of Heeruh of Erak with Herat of Khorasan will cover the apparent anachronisms and false statements of the cross on the walls in the days of Urghanoosh; of the inroads of the Turks or Partheans; of the ancient and previous Christian inhabitants; and lastly, of Khojuh Khezer's assertion that the city was on a rock of the waters; which might be the case previous to any change in the course of the Euphrates. The first statement has I suspect an eastern or Indian origin, having reference to a migration westward of the Gundhara tribes of Buddhist Hindoos from the banks of the Indus, and from them may the district of Arachotia have assumed the name of Kundahar.

Perhaps some Latin author of the period may yet exist, whence the Arabians may have translated their accounts of Heeruh, and thus have furnished them to the Persian makers of histories; attention will I suspect trace many similar mistakes, and alas! dishearten readers from placing much faith in Persian or even Arabian histories of periods earlier than the introduction of the creed of Mohummud.

The Nestorians make Herat to have been the seat of a Metropolitan as early as A. D. 411. That it was destroyed by Othman; at which period there existed a celebrated fire temple called "Shurshuk."

The term Herat, in its largest extent, as the capital of any ruling dynasty, may have been often so applied, as to include many distant places, but in its proper restricted sense, it is a very small valley, bounded by hills and intersected by a stream called the *Huree rood*; the valley is about 80 miles in length, from Obuh to Ghorian and of various breadth,—being about 20 miles in the longitude of the city. This area constitutes Herat proper, but in the common acceptation of the term, are also included many immediate dependencies bearing distinct names. This area is well watered; on its northern side by kareez, from the hills, and on its southern side by the canals taking

off from the river, watering the cultivation and running to the principal towns. The length of some of these canals proves the ancient wealth of the district. The Malan canal, to the north of which is situated the city, is said once to have been carried round the corner of the southern range, and when in good repair, to have discharged its superfluous water into the Furuh rood. The main stream of the Hurec rood early in summer, when full by the melting of the snow, passes beyond Ghorian, and always reaches a small village called *Surrukhs*, east of Ghorian, and hence has arisen the idea that the waters of the Herat river ran to the distant large districts of *Surrukhs* near Merve.

When Herat was the capital of Khorasan and residence of a powerful prince, the whole of the above area was covered with most beautiful gardens, orchards and farms surrounding the various forts of the different chiefs and courtiers. Previous to the late frequent visits of the armies of Persia and of Kabul, the spot is described in all its beauty and fertility, by the most glowing terms of the writers, whether of prose or poetry. It truly deserved its title of the "garden of Khorasan." The twelve canals passing by the various towns and villages have each a name, as have also the many collections of houses here and there built on the banks of the streams. In the early Arabian conquests, a collection of such villages and hamlets obtained the name of the canal on which situated, as the Rood Unjeel, but after the settlement of the Moguls, the word Bolook—the Torkee term for a spring—was substituted, and the same collection is now called the *Bolooke Unjeel*.

Until the days of the Temoorian prince Shah-rookh Mirza, Herat was considered more in the light of a provincial town, than of a royal residence,—it was not the chief capital of any Arsakian or Sasanian king,—nor the residence of any of the Arabian Califs,—but considered rather as a strong fortified frontier position; on the Mogul invasion it rose to greater height; and under Shah Rookh the city reached its present form, and perhaps its highest point of celebrity as to beauty and embellishment, though not perhaps of extent. The walls then had five gates,—the *Urak*, to the west; the *Khoosh* to the east; the *Feeroozabad* to the south,—while to the north were two,—the *Mulek* and *Kutubchak*;—the foundation of the walls were considered 60 zurua broad; the walls themselves 30 zurua in height,—and each side 2000 zurua in length; while the external circuit was estimated at about one fursukh.

The N. E. corner bastion was called Uleesud,—the N. W. corner the Ful Khanah; the S. W. the Khakestur and the S. E. the Khoojuh Abdal Misree. The separate citadel, originally built by Mulek Fuhroldeen Kord in a temporary form, was reconstructed of great strength and solidity by Shah rookh Mirza in 818 H.

In the Ebne Huokul, translated by Sir W. Ouseley, Herat, as the seat of a governor from the Khalif of Bokhara, is not described as a place of any very great beauty, fame or importance; the only building mentioned being a celebrated mosque; as I have before proved, the canals then bore nearly the identical names of the present day, and with a little trouble I believe almost every proper name of that work could be traced in a place of modern times. Edresee adds—"that ere Herat rose to its present importance, a town called Khorasanabad, 9 miles west in the direction of Pooshung, was in greater estimation."

Ebne Huokul mentions a mountain producing neither grass or wood, or any thing but stones, which serve for mill stones. "Here is a place inhabited called *Sekuh*, with a temple or Church of Christians." This is no doubt a portion of the mistaking of Herat for Heeruh, on the Euphrates, where many hermits would have selected barren spots of the sort described for their earthly place of mortifying the flesh.

The moment that the river fairly emerges from the mountains at Oobuh, its waters are by dams forced into various canals, which running parallel to the stream, by degrees diverge from it and irrigate the entire valley, which thus in times of prosperity form one extended mass of gardens, vineyards, orchards and pleasure grounds.

Many of these delightful spots are by their fruit known and celebrated over all Persia. When Herat was the capital and emporium of commerce, and had large funds to employ on agriculture, and ample armies to defend its possessions, these gardens flourished; but when commerce failed by the introduction of new routes and sea voyages, and the country was overrun by hostile armies, the water courses were destroyed, the trees cut down for military purposes or fuel—and the face of the valley reduced to its original feature of a stony upland. Such destruction would be but the work of a season, but the restoration one of many years.

The various divisions with their canals are thus recorded:—

Guzaruh or Malan, to the South of the river and city; Sultan

Sunjer built a grand bridge over the Herat river, on the road to this district, in the year H. 505.

Unjeel. In which is included the city of Herat.

Ulunjan. North of the river, but South of the city ; 5 fursukhs in length from East to West.

Ghoorwan and Pastan. North of the river ; East of the city.

Tooran and Tooneyan. North of the river ; East of the city.

Kheyaban. North of river and city ; near to the Unjeel district, all the dead of the city lie buried in various portions of this division— which is a large field of graves.

Subkur. North of river ; East of city.

Purwanuh and Huwadushtuk. North of city. In it is situated the hill Called Kazur Gah, celebrated for the tomb of Abdullah Ansaree, and for the Tughoor Robot.

Kumburak. South of river.

Oodan and Teerzun. South of river.

Such are the immediate districts round the city whose taxes and grain revenue are included in the collections of the city.

The more distant divisions are :—

1st. The *Heerat rood* ; that is, the Herat river while confined into a more narrow valley than after passing Oobuh ; the altitude and consequently the cold and frost are much greater, hence we find fruits of this kind of climate celebrated as walnuts, apples, almonds, &c. This division also contains many minor districts, as Oobuh ; Kuwashan ; Pooran ; Duk ; Mulmuz ; Feerooz-Koh, the ancient capital of the Princes of Ghoor ; Cheshtee, the burial ground of the celebrated Saint Kuajuh Moodood Cheshtee. A hot spring of some celebrity also flows from one of its hills ; these also contain quarries of white marble, while Shafolan is celebrated for its mines of iron and lead, and a hot spring, which cures many diseases and is in consequence much resorted to by the sick and infirm ; this district of *Herat rood* lies between Herat and Ghoor. The river of Herat rises, according to Arthur Conolly about 10 miles West of Yukaulung, at an elevation of 9,500 feet, passing Deh Zungee, Duolutyar, Badgah of Chukcheran the fort of a leading chief of the Feeroozkohees. After some miles more through this almost independant Emak, the river and its boundary lands constitutes the district of Herat, called *Herat rood*. The country North of this

line, circling by Muemonah towards the country of Balkh, is known as Ghorjestan.

The division to the North-East of Herat is Khorukh, once a most fertile and populous spot; it lies some 50 or 60 miles to the east of the still more celebrated canton of Badgheesh.

This district is about 160 miles long by 120 broad, situated to the North of Herat, being composed of both high mountains and correspondingly low vallies; it enjoys a great diversity of climate, producing both cattle, corn, fruit and timber; in particular a tree called Uroos, which is seldom destroyed by rot or insects; 70,000 Khurwars of grain were with no difficulty collected from this division in the days of Sultan Husuen Bahadoor Khan, as the grain revenue. Robate Khoosh is considered on the boundary between Herat and Badgheesh. A river of some size, called the Purkhud, is mentioned in Badgheesh.

Three circars did compose this district—Lungur Umeer Gheeyas, Chuhel Dokhteran and Jurlan.

The first owes its name to a holy Seyud of the days of Timoor; the second is watered by a rapid stream, and the third contains the wonderful fort of Nurutoo, situated on the summit of a bare rock, with only one narrow winding road to the gate; than it is no stronger fort in Khorasan. The climate is so cold that flowers appear here only in the autumn of the lower altitudes. Tukhte Mulek is a small district surrounded with mountains, which during even summer are capped with snow.

Direct west of Herat, between it and Ghorian, lies Pooshung, with its robat and musjed, the former being one of bad omen. Near the hills round this robat are marks of feet imprinted on the stones, said to be those of the prophet Abraham; while all the stones are in the form of birds and animals, being petrifications; there is also, a spring of aperient water much visited by the infirm. Koosooyah is of this district, celebrated for a defeat given to the Moghuls in the year H. 695.

Koosooyuh is the *Kouser* of Edresee and Sir Wm. Ouseley's work.

Felbundan is a large plain entirely devoted to the cultivation of melons of the largest size; to the eye of the stranger these white, round immense melons scattered over the plains appear like sheep lying down to repose.

South of *Herat road*, East and North of Furah, reaching to and at

times including Zumeen deewar, lies an unexplored but often mentioned country, Ghoor—described as a series of strong hills and narrow vallies, giving rise to the several rivers running into the lake of Seestan ; it was once the stronghold of a warlike nation, which conquering eastward became celebrated as rulers of Guznee. The chiefs claim descent from Zookhak, others again contend they are descended from the lost tribes of Israel, but allow that they embraced Eslamism at a very early date in the days of Ulee ; whose firman they possessed till the days of Buhram Shah, son of Sultan Musood.

The fort of Kheesar is celebrated for its strength, and for its resistance to the armies of Chunguez Khan ; this king granted the district to the chief in possession, Roknoldeen, who thus became the founder of the Kord dynasty in Herat ; and a firm ally of the Moghuls.

The following streams flow South from Ghoor : The Moosa Kula Khashnahr, Furah and Guz, besides many famous canals, as the Ebraheemjoe.

Ahunguran, Khurshut, and Urmaj are mentioned as forts of this country.

Below the range of hills bounding the valley of Herat to the South, lies a large district usually considered a dependency of the city ; it is called Esfezar, and is watered by a river of the same name. On the banks of the stream are the ruins of what was once a fort of the greatest strength of position and art, called Mozuffer Koh, and built by Uluptegen.

The fort was situated on the very top of a rock, the sides impervious to horsemen, infantry, or almost even birds ; there was one winding entrance towards the river, the walls were nearly 30 feet broad ; so that eight horsemen could ride abreast ; a stream of water also flowed from the top of the rock. Another strong fort was Sharestan, on the other side of the river, also celebrated for its strength, and said to have been built by Balkuees.

Budrabad and Furumgan were also strong castles, now in ruins.

The two rivers of Udruskeen and Guz unite in this district, near the town of Subzwar. This word Esfezar is considered a play on the term Sepurzur ; and may be the position of the country to which one of the silver shielded Regiments of Alexander was banished by his successor for mutinous conduct. Declining southward in altitude, this

district is extremely fruitful, its pears are celebrated, as also the small unab, which are as delicate as grapes. The fort was once of great strength. One district, Zawul, was celebrated for its karez, the waters of some being so strong and ample as to turn mills.

Ubkal or Ookul to the South, and Junburan to the East, are districts; from the latter the road leads to Duolutabad.

Furumgan is mentioned as containing the beautiful carved pulpit of some early saint, which was destroyed by the barbarous Beloochees. This place had the reputation of being older than even Herat.

To the South, on the Udruskun, were two small forts opposite each other, called Dokhtur and Pesur.

The modern town of Subzwar is a mean place, consisting of a collection of mud huts.

Amply watered by the several streams issuing from the mountains, this district was once considered the granary of Herat, but the absence of security and good government has almost destroyed its prospects and reduced it, with all the surrounding country, to a very barren, ill-cultivated, inhospitable tract. The present population is Tajeek and Persian—the dominant tribe Afghans, under a Sirdar from Herat.

South of Subzwar lies the country called *Furah*, sometimes considered independent,—indeed once said to have been the capital of a mighty kingdom and the residence of the Persian hero Rostum. It was subsequently a district of Seestan, but is now claimed as an outwork of Herat.

The chiefs of *Furah* have always asserted for themselves a very illustrious descent, and have often struggled to obtain their hereditary freedom; opposing a foreign yoke. One Governor from Herat is mentioned as finding them so troublesome that he invited eighteen chiefs to a feast, and murdered the whole; only one escaping.

Near the town is a hill called Burunduk or Beechuk; this contains a natural arch and cavity, from which water constantly drops. This phenomenon is by the vulgar connected with the divine author of all things, and considered a mysterious proof of his hidden power, hence it has become a place of pilgrimage and of votive offerings; if the water increases in its droppings on the head of the devotee it is a sign of success to his prayer. The place is called Take-sungee and Koh-hejurban.

Anar-duruh is a large district of this country, celebrated for its pomegranates. The forts of Kah and Ook lie south of Furah. The former west of the river; Ook is the name of a sub-division lying between Furah and Seestan; a range of hills in it contains one of those singular slopes of sand called Reg-ruwan, to roll down which is considered a very meritorious action. On this range is said to exist the ruins of Tukhte Rostum, a stronghold of this warrior. Modern Furah is a place of no strength and nearly deserted.

The river of Furah is a large stream, about 30 miles above the city, in July it was 35 yards broad, $2\frac{1}{4}$ feet deep, running $1\frac{1}{4}$ miles in the hour, and just fordable, but during torrents often detained caravans.

Furah extends East to the river of Khash, South to Joeen, and North to Aseyabad. Except on the banks of the rivers the face of the country is composed of large flat hard dushts separated by bleak ranges of hills.

The aborigines are Tajeeks and Persians; the dominant tribe Afghans, under a prince or chief from Herat.

To the South of Furah lies Seestan or Seegestan, sometimes called Nemrooz. The earlier inhabitants were called Sukan and Sukzee; which last some consider to have been arabized into Sug or Suj, and hence Seejeestan. A tribe was also known as Sunjuree.

Lash and Joween are two strong forts on the frontier; between them flows the river of Furah. We trace Joween in the work of Sir Wm. Ouseley, and in Edresee, and from it have a distinct distance to Zurung, the ancient capital; viz. to Peer or Dostar, one march; to Gurgoonah, (12 Arabian miles,) and to the capital 9 miles, more; say a distance of 44 English miles. Ebne Sued has recorded Zurung as 20 miles to the north of the Helmund; These forts are constantly in the mouths of moderns as places of great strength; Captain E. Conolly found the former a mere castle on a cliff, but the latter a place of more strength, and capable of resisting any eastern armies; as it had often done those of Herat.

The Furah river flows into the lake or Zuruh of Seestan, an expanse of low marshy land intersected by bodies of water of various depth. The lake is in books represented as nearly 100 miles in length by the same in breadth; the exposed lands are culturable, the water swarms with fish, and the reeds and jungle afford cover to endless hogs and wild fowl. The down and feathers of the birds forms a large article of

export. From the number of canals the land was formerly fruitful and valuable; one author says, a kulbuh would in his day sell for 1000 *Kubkee* denars. By the account of natives of the present day the lake is not above 30 miles in circuit.

We have no very good accounts of the country; Captain Christie passed through it in 1810, Captain E. Conolly made a rough survey of the road, while a gentleman of the name of Forbes was murdered in the attempt to reach Kundahar from Persia by the Seestan route. According to histories the ancient capital was called Zurunj, situated in Lat. $30^{\circ} 30'$, and distant 90 Arabian, or 118 English miles from Ghe-reesh, the ferry on the Helmund. I think its position may be fixed with some precision on these data, and will be found to correspond with the ruins of Zero, No. 40 of Captain E. Conolly's map.

A fort called Rostum was situated near the lake; while a stronghold named *Husne Tak*, is mentioned having three separate circumvolutions of walls; between the 1st and 2nd were the fields and cultivation, between the 2nd and 3rd were the houses of the people, and within the third was supposed to be the prison, where criminals were starved; one author states he had seen a house containing 4000 skulls of human beings.

Zurunj certainly existed during the Alexandrian expedition towards India, and is mentioned in the early histories of Moslem conquests; it was also the capital during the supremacy of the Safar dynasty of Seestan, and must have enjoyed great wealth and prosperity, as the centre of the large dominion which included Fars, Kirman and Khorasan.

Tak was destroyed by Muhmood of Guznee, who then took the name of Soltan: and this capture might account for the abovementioned heads in the inner fort. But there exist several places of this name.

Without minute inspection it is most difficult to settle such locations. Sukwuh was mentioned to me as the capital, and I suspect occupies a position south of the ancient Zurunj, being, I conclude, the city near Koh-e-Khuajah, and identical with Tak. It is the residence of Muhammad Reza Khan Seestanee, who considers himself descended from the ancient Keeanian kings; the city is said to be half as large as Kundahar, and to be 10 miles from the river Helmund. A place called Rukhuj was mentioned as a very ancient ruin where are yet dug up old coins. Zal is the position of an old fort on the river: Zuenoon, or Juenuon; near the modern fort of Alum Khan is the point where the Khash river

joins the Helmund, while Mean-roddee or Roodbar is the strip between these two rivers constituting the base of the district of Gurmsael. Julalabad is a collection of hamlets, the property of Reza Khan. Shuhruk is called the town of Mehdee Khan Sustanee.

I have no doubt, that in former times when the whole of this country in its largest extent, of the space between Kundahar, Kirman and Herat, was subjected to a very powerful dynasty; life and property safe; and the reward of labour secure; that the whole face of the country was irrigated by canals taking off from all the rivers; but since these have been destroyed, the body of water reaching the lake is much augmented and hence its limits so extended as to have altered entirely the face of the country.

The country contains many natural curiosities, as burning hills, pits of sal-ammoniac, veins of sulphur, and beds of saltpetre; the production of this last mineral made the country valuable. Nader Shah made the possession of it a subject of boast to the Porte, on this account. Peer Kisree is celebrated for its salt and asafœtida. The following is an attempt to reconcile several published routes.

Edresee.	Sir Wm. Ouseley's translation.	Capt. Conolly's map.	Common report.	Capt. Conolly's map.
Joween, 1 j	..	..	Joween, . . . . .	..
Dostar, .. 12m.	Peer, 1 j.	..	Shaitanuk, and { Bunjar, .. }	Bunjar, 41. Shyban, 42.
Kurkooyuh,	Kerkoonuh 4 f.	Goorgooree, No. 48.	Dushtuk,	A town of Shakorhis.
Zurunj,	Zurung, .. 3 f.	Ruins of Zero, No. 40.	Sukwah,	Sekoha, 29.

Sharuk is the district marked Shakorhis by Captain Conolly.

The ancient road to India is thus given :—

Sir Wm. Ouseley.	Edresee.	Capt. Conolly's map.	Common report.	Miles.	
Zurunj,	Zurunj, . . . .	..	Sukwah,	12	
Rusook,	Zunoon, 1 j.	..	Borj Ulum Khan, Ebraheem Bulloch.		
Shuroor, .. 1 j.	Surooroon, 1 j.	Chuknasoor	Chugnasoor, Kuda,	24	
Hurooree,*.. 1 j.	Hurooree, 1 j.	Hurreeree,			
Dehuk, 1 j.	Dehuk, .. 1 j.	..	Dehuk,	12	Of Khash ?
Abshoor, .. 1 j.	Abshoor, .. 1.	..	Abeshoor,	12	Tulkhab ?
Hustan, 1 j.	Kurooreen, 1.	..	..
Abdallah, .. 1 j.	Huftchean, 1 j.	..	Huft chah,	24	
Best, 1 j.	Abdallah, 1 j.	..	..
	Best, . . . . .	..	Best,	12	

* Crossing the Khash road.

APPENDIX.

Notes by Mr. JOHANNES AVDALL, on the extracts proposed from the work of Moses Khorenensis..

Moses Khorenensis (Մովսէս Խորենացի) an Armenian historian, rhetorician and bibliographer of great repute, flourished in Armenia in the middle of the fifth century. He was well versed in Syrian and Persian languages. He went to Athens and zealously applied himself to the study of the works of Grecian writers and philosophers. His name is well known to the philologers and antiquarians of Europe, by the publication of the text and a Latin translation of his history and geography, by the two brothers, William and George Whiston in 1736. The learned linguist and orientalist, P. E. Le Vaillant De Florival, professor of the Armenian language at the Royal Academy of Paris, has lately presented the literary world with a French translation of the history of Moses of Khorene, which was published at Venice in 1841, together with the text. Although the geography appended to, and published with the history of Moses Khorenensis by the two Whistons is attributed by some writers to another author, yet the genuineness of its antiquity cannot in my opinion be at all questioned.

I have added the original Armenian to Major Andersou's list. As much of his attempts go to prove the great confusion arising from the mistakes of proper names, I also subjoin the same list from a very correct edition of Moses Khoreuensis, as printed at Venice in 1843. Many of the names are different, and several places omitted.

From the preface to this recent edition it appears that the veteran Mechitharistic Society of Venice have experienced no small difficulty in procuring correct manuscript copies of the geography of this ancient Armenian author. Of this they possessed only five in their extensive library. All of them were, however, without the least mention of the dates and places in which they were respectively transcribed, and four were altogether incomplete. After incessant inquiries they at last succeeded in obtaining a beautifully written and most correct and complete manuscript copy of the work from the library of the convent of Etchmiatchin in Armenia, (Գրատան Սրբոյն Էջմիածնի) and thus they were enabled to publish in 1843 a revised and improved edition of the complete works of Moses Khorenensis. A full Catalogue of this library, of

venerable antiquity, comprising 121 pages, was published at St. Petersburg in 1840, by that distinguished and elegant orientalist and Armenian scholar, M. Brosset, who undertook and completed the work under the auspices of his Imperial Majesty the Emperor of Russia. (Vide Journal of the Asiatic Society of Bengal, No. CXXV., old series, page 415—16.)

Fursukh is also an Armenian word, $\Phi\omega\rho\sigma\omega\lambda\upsilon$, or $\Phi\omega\rho\sigma\omega\delta\upsilon\tau$, or խրասախ (*Pharasanga, Latin*); ($\phi\alpha\rho\alpha\sigma\acute{\alpha}\gamma\gamma\eta\varsigma$, *Greek*) signifies a distance of three miles or a league.

Major Anderson has certainly taken a great deal of pains in consulting several Arabic writers. It would undoubtedly be very desirable to give the dates in which these writers did respectively flourish. There is no knowing, for instance, in what year Hamdallah Kuznevee wrote his book, or in what century did he flourish.

A somewhat similar story of the fabulous qualities of the soil of the country is mentioned in the history of Armenia, in connection with the circumstances of the imprisonment of the Armenian king Arsaces by the Persian king Sapor. (See Avdall's paper, Journal Asiatic Society, Vol. VI. page 81.)

It is not only customary, but a very common practice with the Armenian nation to indicate the respective value of numbers by a numerical scale of the alphabet of their language; ω , for instance is 1, $\bar{\epsilon}$, 2, τ , 3, κ , 4, $\tilde{\epsilon}$ 5, $\bar{\eta}$, 6, $\tilde{\epsilon}$, 7, $\bar{\epsilon}$, 8, $\bar{\sigma}$, 9, σ , 10, and so on. The numerical scale of Major Anderson's valuable paper will, perhaps, be deemed more interesting by the addition of another column, exhibiting the characters of the Armenian alphabet, correspondent in their numerical value with those of the other three languages alluded to in the paper. The following is a hurried specimen:—

<i>Value.</i>	<i>Armenian Alphabet.</i>	<i>Value.</i>	<i>Armenian Alphabet.</i>
1	ա	100	ճ
2	բ	200	Մ
3	գ	300	Ե
4	դ	400	Ն
5	ե	500	Չ
6	զ	600	Պ
7	է	700	Ջ
8	ը	800	Վ
9	թ	900	Զ
10	ժ	1000	Ա
20	Ի	2000	Ս
30	Լ	3000	Վ
40	Խ	4000	Ս
50	Ծ	5000	Ր
60	Կ	6000	Յ
70	Տ	7000	Լ
80	Ճ	8000	Փ
90	Չ	9000	Ք

From the edition of the two Whistons, printed in London in 1736.

Persia is called by Moses Khorenenis "Chusti-Nemrozia," touching the eastern border of Khuzastan, and the confines of Media, containing twenty provinces.

<i>Armenian.</i>	<i>Whiston's reading.</i>	<i>Identifications or approximations.</i>
Պարսք,	Persia.	Persia.
Ասպահան,	Aspahana.	Ispahan.
Մէշուն	Mesuna.	Mazunderan.
Հակար,	Hacara.	
Պանայիտ,	Panaetia.	
Կրման,	Cermana.	Kerman.
Կուրան	Curana.	Kharan.
Մակուրան,	Macurana.	Makaran.
Սենդ,	Senda.	Scinde, lower.

*Armenian.**Whiston's reading. Identifications or approximations.*

Հնդ,	Henda.	Hind ; round Sir-Hind.
Մրան,	Merana.	Mehran ; banks of the Indus, upper Scinde.
Պէտվաշտ,	Petvastania.	Punjabistan, the Punjab.
Սագաստան,	Segastania.	Sejestan.
Ապլաստան,	Aplastania.	Afghanistan.
Դեր,	Dera.	Delum, in the Persian alphabet.
Մել,	Mela.	Malia.
Մահիկ,	Mahica.	Mahie, Cambay.
Մաուն,	Mauna.	Mandavie, a place of considerable trade.
Խոջէհաստան,	Chozerhastania.	Khazeristan.
Պալհ,	Palha.	Bulharee, country of the
Եբուհայ,	Ebuha.	
Ռէսիրա Բարհասան,	Rhesira Parhasania.	Producing the best pearls, Bahrien,

Aria is called by the above writer, Chusti-Chorasania, lying between Media, Persia, the Caspian and India.

Կոմի,	Comsia.	Comis.
Վրկան,	Hyreania.	Goorgan, Hoorkan.
Ապրջահր,	Apersaria.	Abewurd ?
Մրում,	Meruma.	Merve.
Արուաստ,	Arovastia.	Arachotia ? Hureeswatia ? Kandahar ?
Հրեկատեշան,	Rheucatesania.	Kho Kakusus, Kabul ?
Նստիմանակ,	Nestimanaca.	
Բեշիլ,	Beznya.	Boozjan, near Jam ?
Սաղկան,	Salcania.	Talkan.
Դոզկան,	Docania.	Damghan ?
Անապալ,	Anapalia.	
Հրում,	Heruma.	Hurce ; Herat.
Չամբիլ րոս,	Zambyrus.	Subzwar ?
Նախեր,	Naxeria.	Neeshapoor.

<i>Armenian.</i>	<i>Whiston's reading.</i>	<i>Identifications or approximations.</i>
Գլգին,	Dezina.	Zoozen.
Աւազակ,	Avazacia.	
Վարջան,	Varzania.	Beerjun ?
Մանսան,	Mansania.	Muzeenan ?
Զակոստան,	Zaxtana.	Kohestan.
Բահլ արք	Bahlia, quae et Par-	Balkh.
Են Պարթևք,	thia.	
Դովմատ,	Domatia.	Dumadutha ; Dumadoot ; or Deemut of Dumawund.
Լարիմանակ,	Larimanacia.	
Շիրի,	Siria.	Saree ?
Բարիկան,	Baricania.	
Դովբոն,	Dobonia.	

Scythia (Սկիւթիա in Armenian) is called Apachtaria (Ապախարք) Bactria or Thurchia, extending from the river Ethil (Volga) to the Emavon (Եմաւոն) or Hemalaya mountains (անդր ձգի մինչև ցճէնս:) even unto Zenia (China.) Emavon (Եմաւոն) is the loftiest and longest of all mountains. Scythia is inhabited by forty-four nations, among them the Sogii (Սոգիք) Thookharii (Թոուխարիք) Hephthalii (Ջեփիթալք) and several other barbarous races and tribes. The Sogii are famous for their wealth and love of commerce, and inhabit the country lying between Thurecastania (Թուրքաստան) and Aria (արեաց աշխարհին:) The Sogii are perhaps the Sakæ.

From the Venice edition of 1843.

Persia is called by Moses Khorenensis, Chusti-Nemrozia, touching the eastern border of Khuzastan and the confines of Media, containing twenty provinces.

<i>Armenian.</i>	<i>Ardall's reading.</i>	<i>Identifications or approximations.</i>
Պարսք,	Persia.	
Ասպահան,	Ispahan.	
Մէշուն,	Meshun.	
Հակար,	Hakar.	
Անայիդ,	Anayid.	

<i>Armenian.</i>	<i>Avdall's Reading.</i>	<i>Identifications or approximations.</i>
Կրման, †	Kerman.	
Կուրան,	Kúran.	
Մահուրան,	Makúran.	
Սենդ,	Send.	
Մերան,	Méran.	Hend, omitted.
Պէտվտշտ,	Petwasht.	
Սագաստան,	Ságástán.	
Ապլաստան,	Aplástán.	
Գեր,	Gher.	Ghor.
Մեղ,	Mégh.	
Մահիկ,	Mahik.	
Մաւն,	Mawún.	
Խոճէհրաստան,	Kocheristán.	Cutch or Kedge.
Պալ,	Palh.	
		Ebuha omitted.
Ռէշիր 'ի Պահրսան քաղաք	Reshír, in the city of Páhrsán.	
Aria is called by the above writer Chusti-Chorasanía, lying between Media, Persia, the Caspian and India.		
Կոշմ,	Kóshm.	
Վիրկան,	Vírkán.	Workan, Hoorkan, Goorgan.
Ապրշահր,	Aprsháhr.	
Մերում,	Merúm.	
Արուաստհրէւ,	Arwásthrew.	
Կատեշան,	Kátéshán.	
Նեմանիմակ,	Nemánímák.	
Բիյն,	Bíjín.	
Սահկան,	Sághkán.	
Գոզկան,	Gózkán.	
Անապլահ,	Anápláh.	
Հիրում,	Hirúm.	
Չամ,	Zám.	
Պերոզ,	Peróz.	
Նահչեր,	Nákhcher.	
Դէզնուաղակ,	Dezinwázák.	

Armenian.

Ardall's Reading.

Identifications or approxi-
mations.

Վարջան,	Várján.
Մանշան,	Mánshán.
Ջակտան,	Jákestán.
Բահլ, որ էն Պար- թիաք,	Bahl, i. e. Parthia.
Գովմատ,	Góvmát.
Վարիմանակ,	Várimánák.
Շիրի,	Shíri.
Բարիկան,	Barikán.
Գովբոն.	Dóvbón.

Note on the transport of coal from the pits at Sonadeh to Bombay, by the Nerbudda.—By R. N. C. HAMILTON, Esq. Resident at Indore.

No. 494 of 1849.

From R. THORNTON, Esq., to the Secretary Asiatic Society, Calcutta.
Dated Agra, the 1st May, 1849.

General Department, N. W. P.

SIR,—In continuation of the letter addressed to you from this Department under date the 1st February last, I am directed to forward, for submission to the Asiatic Society, a copy of a note by Mr. R. N. C. Hamilton, Resident at Indore, on the transport of coal from the Pits at Sonadeh to Bombay, by the Nerbudda.

2nd. The Lieutenant-Governor observes that the above note is by far the best and most useful narrative of the experimental jouruies, which has been compiled. The Society will, of course, decide whether it is worth their while to publish more on the subject.

I have the honor to be, Sir,

Your most obedient servant,

R. THORNTON,

Assistant Secretary to the Government N. W. P.

Agra, the 1st May, 1849.

Government having determined that the coal fields in the valley of the Nerbudda should be examined and an attempt made to convey the coal from the pits by the Nerbudda to Bombay, at the suggestion of Mr. R. N. C. Hamilton, the Resident at Indore, Mr. A. Johnstone, of the Steam Factory Establishment, was deputed from Bombay, to join Mr. Hamilton at Sindwah Ghát, on the 15th of January 1848.

Having reached the coal fields at Sonadeh, between Hossingabad and Baitool, the bed of the Bora-nuddee was carefully examined; coal was to be seen in both banks, but especially in the left, in which a place having been selected, the sand being cleared, the coal seam was exposed, situate in sandstone between two layers of shale.

The upper sandstone was 30 feet thick to the level of the surface of the country, coarse-grained and soft; next four inches of shale, then the coal seam 19 inches, and again shale 4 inches, hard and firm; then sandstone close-grained and difficult. The angle of the seam was $7\frac{1}{2}$ N. by E., and from the appearance of the country, which formed a basin surrounded by hills, there is every probability that the bed was as extensive, and would prove plentiful.

Excavation from the bank was immediately commenced, and about 500 maunds having been raised, arrangements were made to send it to the Nerbudda.

Sonadeh to Hossingabad is about 40 miles on the road to Baitool, but the Nerbudda between Hossingabad and the Dharee falls was found by Lieut. Keatinge to be quite impracticable for laden boats.

Captain Fenwick left the Sonadeh pits on the 9th March with the coal laden on Bunjarah bullocks, and arrived at the Dharee falls of the Nerbudda on the 25th—the distance being about 100 miles.

Each bullock carried about $1\frac{1}{2}$ maund, or 1 cwt.; they however, requiring to be daily laden and unladen, are not suitable for the transport of coal, which is much broken and injured by the manner in which the bags are turned over and let fall, when unladen; carts can travel by the route, and would take from seven to eight days to reach Dharee.

The cost of bullock carriage for grain is 5 Nagpore rupees per 100 maunds, for 100 miles.

To Dharee may be considered the first division of the trip, and here should be a main depôt, in which coal may be stored during the dry season.

At Dharee the coal was shipped, Captain Fenwick started on the 5th of April in a small boat with three men and reached Mundlaisir on the 9th; the coal came down in separate batches on boats of various sizes, the largest carrying $2\frac{1}{2}$ manees, equal to 30 Bengal maunds. The whole of the coal, about 400 maunds, reached the Sahesurdarra barrier and falls, below Mundlaisir, the first serious obstacle, on the 14th, having been 8 whole hours in transit.

The following remarks explain the nature of the navigation. After leaving Dharee the stream for a mile is narrow and confined between high perpendicular rocks, when the river is very full whirlpools are formed, but at this season the water was shallow. From Dharee to Sillana, about $9\frac{3}{4}$ miles, no particular difficulty was met with; from Sillana to Alliagan, about $12\frac{1}{2}$ miles, two difficult channels were encountered at Bhyroopuran, and at Bhaleran-tur (tur denotes rapids and shallows) through which the laden boats were passed with much labour; from Alliagan to Murdana Ghát, about $7\frac{3}{4}$ miles, several bad places occur, the worst being Surkuree-tur; from Murdana Ghát to Mundlaisir, 12 miles, the whole way is obstructed by rocks, the water in several places very shallow, but the navigation not particularly dangerous; from Mundlaisir to the top of the Sahesurdarra falls, $4\frac{1}{2}$ miles, the river is quite clear and deep. The falls and rapids at Sahesurdarra are impracticable for laden boats; empty ones are let down with considerable difficulty, with the help of ropes and bamboo poles.

It was necessary to take the coal over the rocks for about 600 yards in bags on men's shoulders, and re-ship it at the bottom of the rapids.

This may be termed the second division of the trip, and here there should be a second store or depôt on the high bank, which affords a favorable site.

On the 16th April Captain Fenwick left Sahesurdarra with a fleet of 15 boats, the coal being distributed among them according to their sizes,—30 mauuds was the largest cargo.

Between Sahesurdarra and Akbarpore* (5 miles) the chief obstacle met with was at Manawapat-tur; the boats were half emptied and eased down the rapids with ropes, the villagers readily assisting and holding on the ropes. The coal was carried over the rocks by the boatmen.

* The ferry of the Agra and Bombay road.

From Akbarpore to Kuthora, about $8\frac{1}{2}$ miles, the water was generally shallow, and at the rapid below Akbarpore, the boats were let down, as before with ropes made fast to the stern. At Bhownosur-tur, the channel was not more than 8 feet wide between bad rocks.

From Kautora to Kirmee, about $12\frac{1}{2}$ miles, and on the Chikuldah, 15 miles passage Sotabonda at 6 miles several bad obstructions were overcome, the channel narrow between rocks, was passed through by punting.

The fleet reached Chikuldah on the 20th April, and from the falls immediately below the Harunphal being impracticable, a third dépôt must be at this place, where there is a bungalow belonging to the Bheel Agent. Chikuldah is on the right bank, and is a Purgunnah of Holkar. On the left is the petty state of Burwain, the chief town of which, Burwain, is about 4 miles from the river opposite to the small town of Chikuldah.

As further progress by water at this season (April) was impracticable, the coal was housed and Captain Fenwick started by land for Baroach on the 27th, with 48 maunds laden on 26 bullock carts; the road was good viâ all Rajpore (which he reached on the 30th), Oodeypore (on the 5th May), to Kunnolee Chandood on the Nerbudda, where he arrived on the 10th. The cost of land carriage was 14 annas per maund. Here the coal was again shipped on two small boats, and conveyed to Baroach in three days without delay or impediment. Having made the coal over to the Collector of Baroach, Captain Fenwick returned on the 20th according to his instructions, by water, and sailed up to Aktasur, about 15 or 16 miles above Kunnolee, arriving on the 26th, having been six days en route. His further progress upwards was arrested by there not being water enough to float the smallest boat he had with him.

Between Chikuldah and Aktasur the Nerbudda, except in the rains, is wholly impracticable and useless as a stream for the purpose of commerce.

Captain Fenwick returned by land to Chikuldah and thence to Mundlaisir, from whence he took down to Chikuldah two boats which had been built for the experiment; on the 10th July these boats were taken over the Sahesurdarra barrier with the greatest trouble.

On the 29th July, the river being pretty full, though the rains had

been under an average, Captain Fenwick left Chikulda with about 400 maunds of coal on 8 boats. Captain Fenwick led the fleet, and a spare boat with a native writer, brought up the rear; to the Harumphal, 13 miles, the fleet dropt down easily, not a rock or a ripple to be seen, and passed the Bhore Kheeree rapids, extending for about 5 miles, under great apprehension from numerous half sunken rocks, and the current running with great rapidity. At the mouth of this channel one of the boats was dashed on a rock and instantly turned over; nothing more was seen of it until the next day, when it was found broken and swamped. The boatmen swam to the shore; 38 maunds of coal were lost. This was the first casualty; the boatmen were alarmed, it however served to reuder them more cautious.

The fleet proceeded on the 30th July, and passed first through a channel 30 feet wide at Kulakurar, the current rushing with great force, then the Dussana rapids, which were rather dangerous—the boats shipping water from the high waves to Bhutara, which place was reached without any damage. Total distance 20 miles.

On the 31st, for about $\frac{1}{2}$ mile the boats were cased down with ropes under high precipitous cliffs, over shallow rocks. The passage of the Bhutara rapid, $2\frac{1}{2}$ miles, occupied the day. The boats were first lightened and then passed down by two distinct channels—that on the left being the most formidable.

On the 1st August, at two miles below Bhutara the fleet passed through the Hailkurree Gap, the current not strong, between perpendicular cliffs for half a mile, to the Serkurree shoal and rapids, extending from bank to bank, leading to the formidable Noukoghath—one of the worst places in the river, in getting through which some of the boats had a very narrow escape. The progress this day was only $5\frac{1}{4}$ miles.

On the 2nd, about a mile above Hanep two of the boats became unmanageable in the high waves of a rapid and were swamped, with 61 maunds of coal; the boatmen saved themselves by swimming. This is a very difficult part of the river, and about 6 miles of progress was only made this day. The distance from Chiknldah Hanp is computed to be $51\frac{1}{2}$ miles.

On the 3d, shortly after leaving Hanep, is the narrow and dangerous channel of Bhallagorce running between high precipitous rocks, and extending for about 3 miles, and at the outlet a very formidable whirl-

pool was encountered. The distance accomplished this day was about $8\frac{3}{4}$ miles.

On the 4th August the fleet made 14 miles, the river the whole way more or less obstructed with rocks, rapids and whirlpools; especially bad near Surpan, where it came to.

On the 5th, the fleet passed the dangerous shoals and rapids of Mookree, terminating in a whirlpool, and reached Emria, $10\frac{1}{2}$ miles. The native writer's boat, which brought up the rear, struck on a rock and stranded. The people swam to the shore.

Having got the boat off on the 6th, the fleet proceeded on without further difficulty, and reached Baroach on the 9th, and deposited 302 maunds of coal in the Government Customs Godowns at that place. Captain Fenwick left Baroach on the 3rd October, having freighted a Botellah for Bombay with the coal. Off Taraparee Chunchun, the storm, which set in on the evening of the 7th, drove the Patemars far out to sea, and compelled them to put back some distance above Surat; this delayed the arrival at Bombay until the morning of the 15th, when eleven tons and ten cwt. of coal were delivered at the Dockyard, and the experimental voyage terminated.

The casualties en route were 3 boats, 98 maunds of coal, and the baggage of the boatmen. No lives were lost, and no one suffered any personal injury from accidents. The crews were generally healthy, supplies plentiful, and the Bheel tribes most attentive and useful whenever their services were required.

Captain Fenwick having deposited the coal set out from Baroach on the 15th September for Chikuldah *by water*, with the six small boats he had taken down, taking only the baggage of the boatmen and supplies for the party; the fleet reached Chikulda on the evening of the 7th September, after great exposure, but without loss, or meeting with any serious accident. Laden boats could not by any possibility have come up in the then state of the river, generally about half full and latterly very high. The Bareekheree shallows and the Huranphal rocks were completely under water.

The result of the experiment may be summed up as follows: that from Dhairree to Chikuldah it would be quite practicable, with a portorage at Sahesurdarrah, to take down coal after an average rainy season throughout the year, in such boats as are at present employed in the

small intercourse between those two places. From Chikuldah to Aktesur, the navigation in the rains, &c., when the river is full, will always be attended with difficulty, danger and risk; but the impediments are not insuperable, and having overcome them, there is no difficulty to Baroach.

The actual cost of conveyance of the coal from Dhairee to Bombay was 1 Rupee 2 annas per Bengal maund by contract, as follows :

	<i>Rs. As. P.</i>
Dhairee to Sahesurdarrah,	0 4 0
Chikulda,	0 4 0
Baroach,	0 8 0
Bombay,	0 2 0
	Rupree 1 2 0

It may be reasonably anticipated that this charge would be considerably reduced, supposing depôts were formed and a regular system introduced.

With regard to the practicability of laden boats being brought up from Baroach to Chikuldah *at any time*, it is almost premature to form an opinion. I should, however, say the Nurbudda navigation is impracticable for purposes of trade.

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*Note on the Sciuri inhabiting Ceylon, and those of the Tenasserim provinces.—By E. BLYTH.*

Since the publication of my Report on the species of Squirrel inhabiting India proper, Ceylon, Assam, and the whole eastern coast of the Bay of Bengal down to the Straits of Malacca (*J. A. S. XVI, 868 et seq.*), my obliging coadjutors E. L. Layard, Esq. and A. O. Brodie, Esq. in Ceylon, and Captain Berdmore at Maulmain, have favored the Society with various specimens of *Sciuri*, comprising some additional species to those noticed formerly as inhabitants of their respective regions.

Five species inhabit Ceylon, as follow :

1. *Sc. bicolor* (?), var. ; *n. s.*? *Sc. Teanentii*, Layard. Resembles in size and colouring the common large species of the whole eastern coast

of the Bay of Bengal, except that the caudal hairs are always largely tipped with white, save at the base and the extreme tip of the tail,—there is no black moustachial mark nor black border beneath the eye, but a large triangular patch of black behind it and reaching upward to the ear,—also a rusty spot at the base of the ear posteriorly, and the auricle is well fringed with hair, though less copiously than in *Sc. purpureus*,—finally there is much more fulvous-white upon the limbs, leaving only the toes of the fore and hind limbs black. In the common *Sc. bicolor*, the posterior limbs are wholly black externally, and the anterior are wholly black behind, and more or less so externally. In the Ceylon animal, both fore and hind limbs are fulvous-white all round for the lower half, the extremities or toes alone being black. This race has accordingly quite as good a claim to be distinguished by a separate name as either of the other large races of S. E. Asia; and it is interesting to know that it co-exists in Ceylon with *Sc. macrourus* though in a different region, the two (as Mr. Layard assures me) never infringing on each other's territory. It also attains a much larger size than *Sc. macrourus*, being that of *Sc. purpureus* and *Sc. bicolor*: and it is wholly confined in its range to the Kandian country and the more elevated districts generally of the island.

2. *Sc. macrourus*, Forster (described *J. A. S. XVI*, 869). The common large Squirrel of the western districts of Ceylon, to which it would appear to be wholly peculiar.\* It does not attain above  $\frac{2}{3}$  the size of the last. Mr. Layard favoured me with a living specimen, which was extremely tame, and is chiefly perhaps remarkable for its singularly loud and harsh voice. Indeed, the voice would seem to be an excellent criterion of specific distinction among the *Sciuridæ*. This animal carries its tail in the same peculiar manner, curled round on one side, as is observable in *Sc. purpureus* and *Sc. bicolor*, and doubtless all others of the same group.

3. *Sc. tristriatus*, Waterhouse (*J. A. S. XVI*, 874, 1001). This would appear to be the most common species of Palmist Squirrel in Ceylon (vide Elliot, in note to *J. A. S. XVI*, 1272); and I can discover no difference between Cinghalese specimens and examples procured in the

\* That is, in the island; for it is also met with in Travancore, and other neighbouring districts of continental India.

vicinity of Midnapore: one of the former is remarkable for having a strong ferruginous tinge on the upper part of the head.\*

4. *Sc. Brodiei*, nobis, n. s. Very similar to the last, but distinguished by its considerably paler colour, and especially by having a very long pencil-tuft ( $3\frac{1}{2}$  in.) at the extremity of the tail, quite different from what is ever seen in *tristriatus*: beneath the tail, to near its tip, ferruginous as in the other. According to Mr. Layard, "this species is confined to the Palmyra-tree district, from Puttam to Jaffna. How much further round the coast I know not."

5. *Sc. Layardi*, nobis, n. s. Size of the two last, but the colour very much darker, nearly as in *Sc. trilineatus* (vel *Delesserti*), but inclining more to ashy than to fulvous, except on the head and flanks: lower-parts ferruginous, paler on the breast: middle of the back nigrescent with a strongly contrasting narrow bright light fulvous streak in the middle, reaching from between the shoulders to near the tail, and an obscure stripe on either side, barely reaching to the croup. Tail ferruginous along its centre, the hairs broadly margined with black and finally with whitish, besides which is another and narrow black band on each hair towards its base, chiefly seen as the tail is viewed from above; tip black, forming a pencil-tuft 3 in. long. This handsome species is, I believe, peculiar to the upland districts of the island.

In the Tenasserim provinces, I am now acquainted with 6 species.

1. *Sc. bicolor*, Sparrman (*J. A. S.* XVI, 870). Common; but the pale Malayan variety does not appear to have been hitherto observed (though the pale Malayan variety of *Hyllobates lar* is there common).

2. *Sc. chrysonotus*, nobis (*J. A. S.* XVI, 873). Common.

3. *Sc. pygerythrus* (?), Is. Geoffroy, var.? Described *J. A. S.* XVII, 345.

4. *Sc. atrodorsalis*, Gray (*J. A. S.* XVI, 872-3, XVII, 345). I have no doubt now that this species was rightly identified, and that Mr. Gray's habitat of Bootan is erroneous. A third specimen lately received from Captain Berdmore is intermediate in its colouring to the

\* In a letter just received from Mr. Layard, he now mentions that—"at Hambanlotte I got a new *Sciurus*; like *palmarum*, only the head is much redder, the colour of the back and belly more blended, and the animal altogether smaller. This entirely replaces all the small *Sciuri* in that part of the country: they are first seen at Tangalle, and I fancy extend round to Trincomalee."

two formerly described, having the under-parts much lighter ferruginous than in the one, and considerably darker than in the other.

5. *Sc. Berdmorei*, nobis, *n. s.* Nearly one half larger than *Sc. palmarum*: the prevalent colour grizzled black and golden fulvous, with an obscure pale central dorsal streak, flanked by a blackish band: this again by a conspicuous yellowish-white line from the shoulder to the croup; then blackish again, with a second lateral whitish band; below again dusky; and the under-parts yellowish-white, passing to ferruginous towards the vent and underneath the tail. Head tinged with ferruginous: and from what remains of the base of the tail in the specimen, this would seem to resemble in colouring that of *Sc. Layardi*. Length of hind-foot from heel to tip of claws  $1\frac{5}{8}$  in. Rodential tusks deep orange-brown. This species, according to information received from Mr. D. F. Lonsdale, inhabits the Thoungyeen district.

6. *Sc. Barbei*, nobis (XVI, 875). Common in Mergui.

There are no *Sciuri* more difficult to understand than the group exemplified by *Sc. modestus*, Muller, *Sc. lokriah* and *Sc. lokroides*, Hodgson, *Sc. griseopectus*, nobis (XVI, 873), and of which *Sc. chrysonotus* is one of the species best distinguished from the rest. Three specimens lately purchased with a collection formed at Darjiling, differ from all other examples of *Sc. lokroides* which I had previously seen from that and other localities, in having the thighs externally of a bright ferruginous colour: in other respects they are quite similar to ordinary individuals of the species.

*N. B.* The specimen presented by the Batavian Society and described as *Sc. javensis*, Schreber, var., in *J. A. S.* XVI, 871, is *Sc ephippium*, Muller, from Borneo.

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*Supplementary Notes to "The Turæe and Outer Mountains of Kumaon;" Journal of Asiatic Society, Bengal, May and June, 1848.—*  
*By Major E. MADDEN, Bengal Artillery.*

The following corrections of, and additions to, the Flora of the notes referred to, are the result of subsequent visits by Lieutenant R. Strachey and myself to the localities specified; as well as of an examination of

the whole of the plants collected, by Mr. M. P. Edgeworth, to whose assistance I am indebted for the original catalogue in the majority of cases, and for his determination of those where alteration is requisite in the present. The completion of the lists is so far interesting as, to the best of my knowledge, they are the first, exhibiting at one view, the grouping of the plants to be found at any given position in these mountains.

At the end will be found an attempt to identify the plants described, but frequently not named by the late Major-General Hardwick, in his tour from Hurdwar to Sreenugur in Gurhwal, in the year 1796, as detailed in the sixth volume of the Asiatic Researches. The General's route did not conduct him by any means over a tract botanically rich, while he omits many plants which must have occurred; but the paper may be interesting to the Asiatic Society, as tending to elucidate the work of one of its original members, and probably the earliest labourer in the field of Himalayan Botany, as it is to the writer, from the circumstance that the Major-General was his first commanding officer.

Jiaree, p. 352. Kunthagaon, p. 590. The shrub here inserted as *Desmodium?* is *Rhynchosia pseudo-cajan*, (Decaisne,) known in Gurhwal as "Bnn-tour," of which the specific name is a translation.

P. 355. The shrub here called *Gouania leptostachya?* is, I doubt not, Dr. Wallich's *G. nepalensis*, and appears to have been first noticed by General Hardwick near Hurdwar, where, as indeed all along the mountains, this common *G. leptostachya* is abundant in the Kotah Doon, and generally at the base of the mountains, and in the exterior vallies, down to Burmdeo: it is known by the same name (Kala-lug, the black climber) as *Berchemia floribunda*, which it resembles a good deal in habit.

*Carissa diffusa*, (not *Carandas*,) very abundant on all the outer mountains and along their base.

Nynee Tal, pp. 364—372—Add—

*Ulmus virgata*.

*Heracleum*.

*Sanicula elata*.

*Torilis elata*.

*Bupleurum marginatum*.

*Rentera acuminata*.



*Cortia elata.*

*Ptychotis anethifolia.*

*Acronema tenerum* (Edgeworth), on oaks at 8700 feet, Cheenur, where also is to be found abundance of a large plant of this order, not identified.

*Ilex odorata* : (Don's *Prodromus*) is the species inserted at p. 365, as Dr. Royle's *T. serrata* : both names are suitable. The tree occurs on the descent to Kaleedhoongee near Sirmouria village, as well as on the route from Cheenur to Kotah ; also near Deghat in Gurhwal : and Mr. Edgeworth has observed it near Simlah ; the identification with Dr. Royle's *T. serrata* is, therefore, probably correct. It is a large and very beautiful species, growing at from 3000 to 4000 feet above the sea, and is known in Kumaon as Gurshoon and Gurkoula, where the prefix *gur*, denoting *glen*, points out its usual site.

*Cardamine impatiens.*

*Arabis*, Sp.

*Potentilla Wallichiana*, and another, not determined.

\**Rubus lasiocarpus*, *biflorus*, *asper*, *hypargyrus* and *racemosus*?  
Roxb.

*Cotoneaster bacillaris*, (not *affinis*.) "Rous," "Rooes."

*Limonia laureola*. M. Decaisne, who has made a new genus (*Anquetilia*) of this, and removed it to the order *Xanthoxyleæ*, describes the fruit as being 1 seeded. Such is sometimes the case, but it is very generally 2 seeded. The young drupes or berries are even very commonly 3 seeded ; and in each case distinctly 2 to 3 celled, with the stigma 2 to 3 lobed, accordingly want of mature fruit prevents examination as to whether these cells are permanent, beyond the month of June : but certainly 2 at least of the seeds are so ; and from the fruit

\* *Rubus lasiocarpus* is the *R. rosæflorus* of Roxburgh, an identification which escaped Messrs. Wight and Arnott, who have only given his *albescens* and *racemosus* as synonymes. The latter seems doubtful, for *R. lasiocarpus* has a corymb, not a raceme. By *R. racemosus*, I mean a procumbent species, differing from *lasiocarpus* by its being racemose, by the leaves not being tomentose below, and by its trailing, nor erect habit. The flowers and fruit are similar : the former (red) : the latter black, and very woolly. The shrub is common in the woods from 6500 to 8000 feet, and is perhaps *R. micranthus* of Don. *R. hypargyrus* is found on the crest of Cheenur, also with red flowers and woolly fruit : but yellow, not black.

in June, it is clear that the 1st seeded berry is produced by the suppression in some cases of the second seed and cell. The third cell and its seed are probably always abortive. The shrub is abundant where I write, (Binsur mountain,) attaining sometimes a height of eight feet. Its habit of flowering both in spring and autumn resembles that of *Citrus*, near which Dr. Lindley still keeps it; but the persistent calyx, and leaves not articulated with the petiole, are at variance with his character of the *Aurantiacæ*; as the cells, with apparently only one ovule, are with that of *Xanthoxyleæ*. The plant is, or recently was growing in the Botanic Garden, Glasnevin. Its range at Nynee Tal is from 6600 to 8600 feet.

*Xanthoxylon oxyphyllum*. On Luriya Kanta, and observed by Mr. Edgeworth on the ascent from Koorka. It comes very near *Brucea Sumatrana*, as defined and described by Roxburgh, and may be the *B. nepalensis* mentioned in J. A. S. April 1833.

*Rhus velutina*.

*Machilus odoratissimus*.

*Daphnidium pulcherrimum*.

*Litsæa consimilis*. "Cheerura," and "Chírchíra" of upper Kumaon and Gurhwal, where a coarse oil is expressed from the fruit.

*Albizzia wightii* (and elsewhere; not *Acacia mollis*.)

*Indigofera polyphylla*, "Moos-Sukena," a half procumbent shrub, common from 5500 to 8500 feet.

*Indigofera pulchella*. At the elevation of 7500 feet, as well as in the outer portion of the Bhabur forest, this is equally reduced to the height of a few inches. But in the Sal forests at 2000 feet and upwards, it gradually increases from a shrub of 3 to one of 12 feet; under the former aspect it appears to be Dr. Royle's *T. Arghawan*. The number of arborescent *Indigoferas* has probably been exaggerated. Roxburgh's *T. arborea* and *virgata*, seem to be *T. Dosua* of Don, and *heterantha* of Wallich. In the vallies of Kumaon, about Almorah and Somesur, at 4000 to 7000 feet, there is a shrubby species with short sericeous legumes, and small flowers, which appears different from *T. Dosua*, and may be *I. violacea*, but Mr. Edgeworth pronounced it to be *T. Dosua*. Roxburgh's description of the shrubby species of this genus are indifferant.

*Desmodium sulcatum* (Edgeworth), and two undescribed species.

*Podolotus Hosackioides.*

*Crotolaria anthylloides*, to 8000 feet.

*Lespedeza elegans.*

*Flemingia*, (bracteata, Roxb. nearly,) a procumbent shrub with simple leaves and *Dicerma*, like inflorescence: flowers white, streaked with pink: everywhere at 6000—8000 feet on sunny exposures, from the Sutlege to the Kalee.

*Flemingia procumbens.* Procumbent, with deep red flowers and tuberous edible roots, very common from 5500 to 8500 feet; also Simlah, Kussowlee, Mussooree.

*Shuteria involucrata.*

*Phaseolus scaber.*

*Vicia tenera.*

*Pachyrhizus angulatus?* Procumbent, twining, with pink flowers, and large tuberous root.

*Trigonella gracilis.* This plant, with *Argyrolobium roseum* and (*cytisus*) *flaccidum*, is everywhere at Nynce Tal in the rainy season, apparently limited to the limestone rock: at least all three disappear the moment we reach the greenstone of the Gagur, with identical elevation and exposure, &c. *Thymus serpyllum*, on the contrary, does not here make its appearance till we have left both these rocks, and entered the micaceous slate district at Ramgur.

*Androsace sarmentosa* (not *lanuginosa*, which is not found under 10,000 or 11,000 feet.)

*Androsace rotundifolia.* Hardwick, *pink*.

*Lysimachia debilis* and *alternifolia*.

*Sedum multicaule*, *pauciflorum* and *rosulatum* (Edgeworth, not *pyriforme*.)

*Tillæa pentandra*, to 8000 feet.

*Saxifraga Brunonis* covers the crags of Cheenur, facing the lake, from 7000 to 8000 feet.

*Drosera peltata* (*lunata*, auct.) a New Holland plant. Don.

*Astilbe rivularis.* Abundant in the northern glens of Cheenur, &c., and as low as 5500 feet at Shamkhet. This plant, which resembles *Spiræa Aruncus*, oscillates between the Saxifrageous and Rosaceous orders, and both in Royle's Illustrations (203, 226) and Don's Prodrumus, does duty in each *cohort*, being *Spiræa triternata* of Wallich, S.

barbata of Decaisne, and *S. Arnensis* of Don, who had previously described it at full length under *Astilbe rivularis*.

*Clematis grata*, not common at Nynee Tal.

*Clematis amplexicaulis*, Edgeworth, 7000—8500 feet.

*Clematis Nepalensis*, south face of Sher-ka Danda, also at Mnrora, on the Nyar in Gurhwal; always in or by running water, between 6000 and 6500 feet above the sea. On the young flowerless shoots, the leaves are triternate; such variations are not uncommon in this genus, and have perhaps augmented the number of species in books beyond that in nature.

*Aquilegia pubiflora* (not pubescens.)

*Pæonia Emodi*. In beds of many hundred plants before me at Binsur, not above one in ten flowers has two carpels, a number common in the interior. The plant does not, to my knowledge, extend further N. W. than Dhunpoor mountain, one of the sources of the Nyar. In that and the neighbouring districts the young shoots are eaten as a vegetable under the name "Soojoonia," though the plant is called Chundra; it is probable that the long tuberous roots may be one of the species of *Bikk*.

*Epilobium montanum*, cylindrical, and *laxum*?

*Circæa repens* and *intermedia*.

*Berberis Wallichiana*? summit of Cheenur only, 8700 feet.

*Berberis asiatica*. Kilmora: to 7500 feet, as on Binsur and Siyahee Devee.

*Vitis tomentosa*, *rugosa*, on Sher-ka Danda.

*Aralia* or *Panax*. Shrubby, and probably undescribed.

*Millingtonia* (*Meliosma*) *Dillenifolia*. Lnriya kanta.

*Polygala triphylla* and *crotolarioides*.

*Stephania Wightii*, common at 6500—7500.

*Bryonia umbellata*.

*Trichosanthes palmata*. Outlet of the lake, 6400. Perhaps its upper limit.

*Hypericum cernuum*, *Uralum*, *barbatum*, *elodeoides*.

*Acer villosum* (and on Binsur: a beautiful species.)

*Rhododendron arboreum*, (*puniceum*, Roxburgh.) Captain A. Gerard, account of Koonawur, says, that the tree with 'large red flower' ascends to 10,000 feet: but in Kumaon and S. E. Gurhwal, we only

find the variety? *floribus roseis* at this elevation, and up to 11,300; as determined by Lieut. Strachey. It is only while young that the leaves, and still more the leaf-buds and scales of the scarlet *Rhododendron* are poisonous; the flowers are certainly intoxicating, if eaten in any quantity, as I have seen exemplified in my own coolies.

*Linum trigynum.*

*Phyllanthus (Leptopus, Decaisne) cordifolius.*

*Phyllanthus parvifolius, Don.*

*Euphorbia hirsuta* (not *involucrata*,) probably *E. longifolia* of Don's *Prodromus*. A pretty species, resembling the English wood spurge.

*Euphorbia (peplodes.)*

*Schizotechium crispatum.*

*Leucostemma latifolium.*

*Stellaria media.*

*Cerastium triviale.*

*Mollugo stricta.*

*Hedyotis calycina.*

*Randia (Gardenia) tetrasperma.*

*Galium asperuloide, Edgeworth.* Descends to 7500. It has the appearance and fragrance of *Asperula odorata*, but differs in the leaves from Mr. Edgeworth's species.

*Galium aparine*, common in cultivation, hills and plains, from the Ganges to Nynee Tal and Almorah.

*Viburnum cylindricum*, probably Dr. Royle's "*punctatum.*" "*Kala Tit-muliya.*" This shrub is an evergreen, and is common from Simlah to Kumaon, from 6000 to 8000 feet, as are *V. cotinifolium* and *mullaha*. Of these *V. cotinifolium* is identified by Dr. Royle with Wallich's *polycarpum*; and *mullaha* with *stellulatum*. The nature of the plants would lead to a suspicion that the synonymes have been reversed, *V. cotinifolium* being remarkable for its stellate pubescence, as *V. mullaha* is for its abundant fruit: (red.) It preserves the Nepalese name to Kumaon, (*Muliya*, and *Tit-muliya*, from the bitter fruit) and even to Mussooree, (*Maloop*;) but at Simla this is lost, and replaced by *Eree*. *V. cotinifolium* is known as *Jawa* at Simlah, *Gooya* in Kumaon; it has black fruit, and much resembles *V. lantana*. *V. nervosum* of Don's *Prodromus* is identical with his *cotinifolium*; *V. nervosum* of Royle is the *V. fœtens* of Decaisne, an epithet for which it is indebted to the odour of its leaves when



crushed ; the flowers however, have a delicious fragrance of lemon. It abounds everywhere from 9000 to 11,000 feet, the "Thelain" of Busehur, but in Kumaon "Gooya." *V. grandiflorum* was found common on the upper Surjoo by Lieut. Strachey, with the habit of *V. mullaha* : where also occurs another species, perhaps *punctatum* or *adenophyllum* of Wallich ; growing to be a considerable tree.

*Daphne papyracea*, Wallich, *D. Bholua*, Don, formerly inserted as *D. cannabina* on the authority of the former in the Asiatic Researches, unless the shrub there described be *D. odora*, which seems to differ little from the present except in being fragrant. Two varieties are common everywhere in the British Himalaya ; one with white flowers and yellow fruit, is found from 4000 to 8000 feet ; the other with purple flowers and fruit from 7000 to 8000. "The Nepal names Bhulloo-soang and Bholua, if Hindee, and the aspirate be correct, would indicate its poisonous property ; without the aspirate, the strength of its fibre : *Sida rhomboidea* is called Buloo for this reason. But the orthography in Kumaon is "Buroowa," with the prefix, *set*, white ; "Sutpoora" in Gurhwal. No allusion to the plant or its uses is to be found in Dr. Wilson's Dictionary ; but the Almorah Pundits affirm that it is intended in the Umurkosh by the terms Loota, Tuntoovayu, Oornunabhu, and Murkutka, all denoting a spider, weaver, &c., and, as applied to this *Daphne*, alluding to the manufacture of paper from the bark.

*Daphne sericea* ; Don's *Prodromus* ; an examination of many living specimens satisfies me that this includes *Wickstrœmia salicifolia* of Decaisne, and *W. canescens* of Meisner ; the differences are merely in degree, due to age and exposure, and may either be found on the same plant, or on plants within a few yards of each other, and evidently of the same stock. Paper prepared from this—the *Chumlia*, is considered inferior to that of the *Set Buroowa*, allowing the ink to run. The bark makes a strong rope, and is so used at Nynce Tal.

*Osyris Nepalensis*. Descends from 7000 to 1200 feet along the foot of the mountains ; none of the people about Almorah are aware of its leaves being used for tea.

*Geranium bicolor*, Royle, *Ocellatum*, Decaisne ; from 1500 to 7000 feet.

*Impatiens umbrosa* and *tricornis*.

*Evonymus echinata*, a shrub climbing like ivy over trees and damp-shaded rocks, tetramerous.

*Urtica* (*Girardinia*) *heterophylla*, to 7500 feet.

*Urtica parviflora*.

*Urtica Goglada*.

*Pouzolzia* (*Urtica*) *hispida*.

*Cannabis sativa*.

*Bœhmeria salicifolia*.

*Procris*—several species.

*Ficus laurifolia*.

*Ficus saxatilis*? a creeping, rooting species, on trees, rocks and banks, to 8000 feet.

*Myrica sapida*.

*Salix tetrasperma*, "Gur-by-nsh." Grows well along the margin of the lake, but scarcely indigenous, as it appears to flower with difficulty, and is here about a thousand feet above its usual limit elsewhere in the province.

*Salix leucomelas*, Cheenur. Forms dense thickets, from 8000 to 10,000 feet. Common at Fagoo, Huttoo, &c.

*Callitriche verna*.

*Elæagnus parvifolia*? Gheewæen.

*Aristolochia* (*Saccata*?) 6500—8000 feet; Sher and Boorans ka Danda, common on Binsur, the Gagur Pass, &c.

*Rumex nepalensis* and *hastatus*, the last to 8500 feet.

*Pupalia sequax*.

*Achyranthes*, a large white-flowering species; undescribed.

*Polygonum sinense*, *pterocarpum*, *herniarcoides*: the last as high as 7500 feet.

*Plantago asiatica*.

*Viola aspera* and *Patrinii* (*cæspitosa*, Don.)

*Craniotome versicolor*.

*Micromeria biflora*.

*Leonurus pubescens* (not *Sibiricus*.)

\* *Scutellaria scandens*. From 4000 to 8000 feet, a species utterly mis-

\* In the original paper it is twice, (pp. 369, 435,) mentioned that *Melissa flava* grows on Binsur. This is a mistake; the plant intended is a *Nepeta*, probably *N. elata*, Royle. It also occurs on Cheenur at Nynee Tal, and is remarkable from the

named, being in no degree scandent, though Don asks "an potius volubilis!" Mr. Bentham's name, "angulosa," is very appropriate and should be substituted. So *S. repens* is an erect shrub, and requires an epithet expressive of its numerous stems and branches. Many Himalayan plants bear evidence that they were named by persons who never saw them. *Rosa macrophylla*, for example, has not large leaves; they are much smaller than those of the common *R. Brunonis*.

*Begonia tenella*, (not *dioica*.)

*Clerodendron fœtidum*.

*Phryma leptostachya*, common in woods.

*Mazus surculosus*.

*Vandellia nummularifia*.

*Veronica biloba* and *Maddenii* (n. s. Edgeworth.)

*Torenia cordifolia*.

*Datura alba*.

*Solanum rubrum*.

*Goldfussia pentstemonoides*.

*Erigeron semibarbatum*.

*Erigeron Roylei*, "Murchmool." (Not *Aster bellidifolia*.)

*Inula nitida*.

*Conyza veronicaefolia*.

*Diplostephium Roylei*.

*Carpesium pubescens*.

*Oreoseris gossypina*, from 1500 to 8000 feet, (not *Onoseris lanuginosa*.)

*Senecio rufinervis*, (not *canescens*.)

*Senecio spectabilis*, (not *Jacobæa*.)

*Senecio alata*, on Cheenur, but rare.

*Amphirapis cuspidata*.

*Amphirapis pubescens*. (*Solidago nepalensis*, Don.)

*Echenais ferox*, probably the *Cnicus verutus* of Don. It grows from 4500 to 7500 feet, and is found up to Paoree in Gurhwal, and probably much further. If it is Don's plant, it also inhabits Nepal "ad Narainhetty," a spot in the vicinity of Kathmandoo, where per-

flowers opening yellow in the morning but becoming light blue by the afternoon; an example of natural Daguerreotype.

haps from some error in the labelling of Dr. Hamilton's Herbarium, the Prodomus exhibits the most incongruous assemblage of plants.

*Apotaxis carthamoides*, a very bitter plant, probably *A. scaposa* of Mr. Edgeworth, *Serratula carthamoides*, Roxb. and *Cnicus heteromallus* of Don.

*Serratula pallida*. *Centaurea lanata*, Roxb. III. 444, seems to be a Calcutta edition of this.

*Dicrocephala gracilis*.

*Blainvillea latifolia*.

*Sonchus arvensis*.

*Melanoseris cyaneus*, (not *Mulgedium robustum*.) It is occasionally *white*.

*Dipsacus inermis*  $\beta$ , Wallich, *mitis*, Don, is abundant everywhere from 5000 feet, (Almorah,) to above 8700 (Cheenur), while *D. inermis*,  $\alpha$ , Wallich, *strictus*, Don, occurs at Kathmandoo (4500), Koorpaka, (5000) and on Cheenur at 8000, but I consider it merely a variety of the first, as every gradation in the number of lobes to the leaf, and every variation in the number of ridges to the stem may be observed in these supposed species. Under this view, the plant affords a striking instance of depression in its habitat as we travel to the S. E., barely occurring at 8000 feet, Simlah, but at 4500 or thereabouts, in Nepal, according to Dr. Wallich.

*Valeriana elata*.

*Gentiana capitata* and *pedicellata*. *G. Kurroo*, so common on the limestone crags of Mussooree, has not hitherto occurred here.

*Ophelia* (*Agathotes*) *cherayita*. The tetramerous, purple-flowered variety (with a tendency, however, to greenish-yellow) mentioned by Dr. Royle, occurs from 7000 to 9000 feet, in shady woods with northern aspect, on Cheenur, Binsur, Gagur Pass, Mussooree, Simlah, and Nagkunda; and though called by Dr. Lindley, "a Himalayan annual," is in truth, the only perennial *cherayita* with which I am acquainted. The stem is sometimes five feet high, and much branched; the root long, forked, and pale yellow; the root-leaves, petioled, and resembling those of *Plantago*; the whole exceedingly bitter; but the plant is not very abundant; and it is probable that the annual species, *purpurascens*, *cordata*, *alata*, *angustifolia*, &c., supply the chief portion of what is exported to the plains.

Campanula caua, (not ramulosa.)

Cynanchum glaucum and Dalhousiæ.

Tylophora tenerrima? amongst grass, Sher-ka Dauda, Gardneria ovata (or new species.) Haneer Baneer rocks; also abundantly on Binsur and the northern slope of the Gagur Pass.

Pardanthus Sinensis.

Juncus glaucus and concinnus, (not elegans.)

Smilax Villandia, maculata, and vaginata, the last on Cheenur; on Binsur at 7300.

Allium Wallichianum, (not lilacinum.)

Murdannia scapiflora, (v. Aneilema longifolia?)

Dioscorea sagittata and deltoidea.

Arisæma speciosa. Luriya Ranta. Several other species undetermined.

\*Remusatia (capillifera, provisionally. M. P. E.) Probably Don's Caladium pumilum. "Banj ka pindaloo," i. e. *oak colocasia*, common on trees and mossy rocks from 5—6000 to 8—9000 feet. At p. 438, it is confounded with *R. vivipara*, which however is quite distinct, and does not appear to ascend above 4500 feet, as Bheem Tal and Noukoochia Tal, where it is known as "Bagh ka pindaloo," i. e. Tiger's Colocasia.

Cephalanthera acuminata. White wood Orchis, May.

Lycopodium tenellum and —.

Gymnogramme vestita. Top of Deoputa.

Dactylis glomerata.

Ischæmum speciosum, a strong and tall reed-like grass, in abundance under trees, north face of Cheenur, &c., from 7000 to 8,700 feet.

Arundinaria falcata, "Ningala," not *Vingala*, p. 371. The people

\* The opinion is general amongst the people of Kumaon that this plant never flowers; and the majority do not, as is common with plants reproduced by hulbs, &c. These appear in September on radical procumbent panicles, (not erect spikes as in *R. vivipara*,) and the scales each ending in a long white spirally twisted awn give the whole the appearance of a tangled mass of thread. The flowers appear in June, a little before the rains set in, and before the leaves expand, and as the scapes are only 2 or 3 inches high, and soon curve down amongst the moss, &c., are easily overlooked, though the spathe is of rather a bright yellow; much like that of a small *Arum* with pedate leaves common at Simlah, and as far up as Cheenur in Kunawar.



of Danpoor Pergunna, in the north of Kumaon, enumerate no less than eight kinds of Ningala, or Ringal, as it is pronounced in Gurhwal, viz., 1. Tham ; 2. Utham ; 3. Kutino ; 4. Malingo ; 5. Jhoomro or Jhoongra ; 6. Deo Ningala ; 7. Gor Ningala ; 8. Doom Ningala. The last is probably the common, or Kalee Ningala, found abundantly on the Gagur range, and, like the Jhoomro, in much request for pens. My friend Dr. Falconer refers it to a new genus, *Thamnocalamus*. No. 1, is said to be the largest of the whole, and is sent down to the plains for hookkah pipes ; but I have never noticed it, or any but the last three. No. 6, is the *Arundinaria utilissima* of Mr. Edgeworth, and occurs in great abundance near the snowy range : making excellent mats, baskets, fishing-rods, &c. No. 7, I met with all along the Undreteer river below Rol in Busehur, (there called *Gol*) with thin culms 18 feet high, in dense clumps of a hundred or more to each.

The tree entered at p. 372, *Gyandra laurina* is that which Dr. Royle alludes to, p. 261, under *Ilicinæ*. It rather belongs to *Flacourtiacæ*, Mr. Edgeworth informs me, as well as that the name *Gyandra* has been previously appropriated to one of the *Gentianæ*.

To the lake plants enumerated at p. 358 are to be added—

*Myriophyllum tuberculatum*.

*Potamogeton crispum, pectinatum, parfoliatum*.

These and the other Himalayan species of this genus are all identical, Mr. Edgeworth informs me, with those of Europe ; the presence, therefore, of *Polygonum amphibium* in Nynee Tal, becomes less anomalous ; and considering the number of aquatic birds which frequent the lake, Gmelin's theory of diffusion by their agency does not seem an unlikely solution of the problem as to how these plants came here.

The following memorandum by Lieutenant Strachey, which reached me too late for insertion in the original paper, may be best introduced here ; the elevation of localities at Nynee Tal being those chiefly affected.

“The heights of places in Kumaon, given on my authority in Major Madden's paper on ‘The Turæe and Outer Mountains of Kumaon,’ are to be considered as mere approximations to the truth. Those at Nynee Tal and its immediate vicinity, are, I think, generally 200 feet too little. They were calculated on the assumption that the water of the lake was 6200 feet above Calcutta, whereas there is every reason to suppose that the true elevation is nearly 6400 feet.”

6409 is Lieutenant Strachey's determination, which will give for

|                                                         |      |                           |
|---------------------------------------------------------|------|---------------------------|
| Cheenur, . . . . .                                      | 8732 |                           |
| Cheenur (or Deoputa) ka Khan,                           | 7623 |                           |
| Uyarpata, . . . . .                                     | 7908 |                           |
| Luriya Kanta, S. W. peak, . . . .                       | 8169 |                           |
| „ „ highest, . . . .                                    | 8200 |                           |
| Kotah Bagheecheu, . . . . .                             | 2269 | (2269)                    |
| Gagur Pass, . . . . .                                   | 7200 |                           |
| Ramgar Bungalow, . . . . .                              | 5945 |                           |
| „ Bridge, . . . . .                                     | 4884 |                           |
| Peeoorah Bungalow, . . . . .                            | 5644 |                           |
| Almorah station (Mr. J. Strachey's<br>House), . . . . . | 5586 |                           |
| Birond Peak, p. 394, . . . . .                          | 7052 | (Trigonometrical Survey.) |
| Kaleedhoongee, . . . . .                                | 1370 |                           |
| Huldwanee Mundee, . . . . .                             | 1549 |                           |

From the Bumoree or Káth-godam bungalow, at the base of the mountains, 1809 above the sea, to the southern limit of the Huldwanee cultivation, a distance of 6 miles, the fall was determined by Captain Jones of the Engineers to be 360 feet; it continues at such a rate that Rampoor is only 547, Moradabad 674 feet, and Bareilly 470 feet above the sea: such is the glacis in front of the vast bastions of the Himalaya.\*

\* The heights of several places in Kalee Kumaon inserted chiefly on the authority of Dr. McClelland's map are generally several hundred feet too much; the following, from barometrical observations, by Mr. John Strachey, are very near the truth.

|                                            | <i>Feet.</i> |
|--------------------------------------------|--------------|
| Bylchheena Pass, . . . . .                 | 3709         |
| Belkhet, . . . . .                         | 1525         |
| Chhirapanee, . . . . .                     | 6454         |
| Kanadeo, . . . . .                         | 7241         |
| Jhoom (Sooe), . . . . .                    | 7105         |
| Dhurgura (Thermometer H. S.) . . . . .     | 4500         |
| Kunthagaon (ditto) . . . . .               | 3900         |
| Puyapanee, . . . . .                       | 7049         |
| Dol Bungalow (Thermometer H. S.) . . . . . | 5438         |

Between Nynee Tal\* and Kalaputhur, pp. 373—375, Add—  
Cucumis Hardwickii, up to Koorpaka.

*Leea aspera.*

*Hedera terebinthacea.*

*Ruta albiflora*: descends to 3000 feet, near Kalaputhur, to 4000 at Bheem Tal; but in the drier region of Almorah not below 5000.

*Coriaria Nepalensis*, from 2000 to 7600. Dr. Royle gives the lower limit about Mussooree as 5000.

*Sageretia oppositifolia.*

*Impatiens balsamina*: 4000 to 5500.

*Ilex odorata.*

*Polygala oligophylla*, at 2500.

*Desmodium Gangeticum.*

*Argyrolobium roseum*, from 2500 to 7500. Very common.

*Rumex Wallichianus.* Base of mountains.

*Rungia parviflora.*

*Peristrophe speciosa.*

*Lepidagathis*——.

*Porana racemosa.*

*Periploca (Streptocaulon) calophylla.*

*Loranthus scurrula*, W. and A.

*Plectranthus rugosus.* To 6500.

*Salvia plebeia.*

*Ajuga remota*, (lobata? Don) common along the base of the mountains.

*Verbena officinalis.*

*Lantana dubia*, quite common from the forests of the Bhabur to about 3500 feet an undoubted native.

*Gynura nepalensis.*

*Blumea alata.*

*Conyza polycephala.* (Edgeworth.) To Hurdwar.

*Sonchus arvensis.* To Kalaputthur.

*Youngia runcinata.*

*Aplotaxis cirsioides*, common in cultivation to 3000 feet. *Carduus lanata.* Roxb.?

*Sauromatum punctatum.*

\* To the vegetation of Nynee Tal add *Urtica scripta*, Don.

*Sagenia coadunata.*

Below Kaledhoongee, *Calotropis Hamiltonii*, which I had not noticed, was found by Mr. Edgeworth, but *C. gigantea* is by far the most common: at Hurdwar, 80 or 90 miles, N. W. the former is the only species.

*Acacia* "*Kureo*," of p. 374, appears to be *A. elata*.

Kotah Doon, p. 379.

*Ficus cordifolia*? "*Gujeeoon*." Known in Gurhwal as the "*Kabur*;" it is I think, the tree called Peepul in Goojrat, where *F. religiosa* is "*Peepa*." The *Gujeeoon* may be *F. Tsiela*, Roxburgh's next species to *cordifolia*.

*Pterospermum suberifolium*. "*Moochkoonda*." At Gintee village, but no doubt an exotic.

*Elæagnus conferta.*

*Zcuxine sulcata.*

*Plectranthus Coetsa*. To 2200 feet at Kotah, and also in the Dehra Doon, by water courses; it differs somewhat from the normal form, usual at 4000—8000 feet; but less so than the plant which we find at 11,000, which is pronounced identical. The wild goat is very fond of this last variety.

*Thalictrum foliolosum.*

*Trochostigma*. A large semi-scandent shrub occurs in the forests along the base of the mountains in this neighbourhood, as well as along the whole line from Rikhikes on the Ganges to Burmdeo on the Kalee, and up the Surjoo to Kupkot. Flowers in May.

*Tetranthera monopetala*. "*Kutmura*." "*Singrow*."

*Harina oblongifolia*. The Buliya Glen above Bumouree is *not* its N. W. limit; Lieutenant Strachey obtained specimens between Kotah and Nynee Tal; and I have myself since found it growing luxuriantly in Gurhwal on the Aonla Boonga Pass, between the Patlee Doon and Kala-khan on the Ramgunga. The people there (few and far between) did not know the plant, nor did it occur onwards in the Hurdwar direction; the Patlee Doon may therefore be safely considered its boundary. *Symplocos racemosa* reaches to within a few miles of Hurdwar.

*Abrus*, p. 381. This species also grows on the hills east of the Patlee Doon, and below Bheemtal, but sparingly in both localities.

Polgurh (properly Puwulgurh) p. 376.

*Medicago hystrix*.

*Buchanania latifolia*.

*Schrebera Swietenoides*. "Moka." This tree occurs near Polgurh in considerable numbers, scattered in the Sal forest which clothes the high southern bank of the Dubka; a small hamlet below is named Mokanee from it. Lieutenant Strachey discovered the tree in this locality; I had previously met one or two in the Dhikolee Pass, but, wanting flowers and fruit, could only conjecture it to be a *Bignonia*, of which, and *Swietenia* (Mahogany) it has entirely the habit. It has not occurred elsewhere, and being tomentose, may possibly be different from Roxburgh's species; but Mr. Edgeworth informs me that the foliage, &c., is similarly clothed in Bundelkhund; where it is called *Ghant*. The Kumaon name is used in the Peninsula, and is evidently derived from the classical *moksh*, *moovku*, in allusion to the *pendulous* fruit, as the synonymes *Ghunta-patulee* and *Ghunta-parulee* (*Bell-Bignonia suaveolens*) refer to its form; and *Kshardroo* to the *ashy* color of the fruit and bark. Dr. Wilson does not give any identification of these terms; nor does Dr. Lindley notice Roxburgh's genus.

Seetabun, p. 383.

*Crotolaria neglecta*. To Rikhikes in the Dehra Doon.

*Trewia nudiflora*, common in the Dehra Doon.

*Sabia paniculata*. Sansadhara in ditto.

*Scutellaria repens*.

*Gentiana aprica* (*decemfida*, Don.) Damp shady banks.

Mohan, p. 386.

*Hemiadelphis polysperma*.

*Polygonum glabrum* and *barbatum*.

*Mazus rugosus*. To Hurdwar; and to 7400 feet, Binsur.

*Nepeta graciliflora*, ditto.

*Ficus laminosa*, *Kosilla*, Dhikolee Pass, and every similar spot on to the Ganges at Tupoobun.

Chilkiya, p. 388.

*Gwatteria Korinti*, (at Gybwa.)

*Trophis aspera*, "Roosa"

*Rubus distans*.

In the market here, the fronds of *Adiantum capillus veneris* and



venustum are sold in considerable quantities under the name of *Hunsraj* (Toolsee in the hills,) being used as a dye.

At pp. 392, 441, 442, some confusion has crept into the enumeration of some of the species of *Sinapis*, which will be best cleared up by a simple statement of their corrected names.

*Sinapis dichotoma*, "Juria," "Judia," also "Luhota" and "Lyhta" in the Bhabur; "Kalee-surson" of Northern India.

*Sinapis glauca*, Roxb. "Rara," "Rada." "Bunga-surson" of Seharunpoor and the Dehrah Doon. "Peela, Peoora (i. e., yellow and usl Surson, and often "Surson" simply, of Oude and Rohilkhund. The Kumaon plant is exceedingly like *Brassica Napus*, grown from European seed.

*Sinapis glauca*. Royle, and Edgeworth, account of protected Sikh States: not noticed in the *Flora Indica*. "Dyn," "Daen," "Lae" of Kumaon and Gurhwal: sometimes "Khetiya," "Toree" and "Toria," (s. *tuvria*, pungent) of northern India, where this variety or species is in general cultivation, including the Himalaya up to the villages of Joohar, at 11,000 feet elevation.

The "Teera" from Benares, p. 392, is the "Rae" and "Mukura Rae" of p. 442; its specific name is still unknown to me.

Huldwanee, pp. 395—399.

*Saccharum Sara* or *Munja*. The lower half of the culm is called *sentha* and *serput*; the upper half, *sirkee moonj*; rope is made from the leaf-sheaths. From Sir William Jones' expressions, it would appear that *munja* is simply the culm of *S. sara*: "from the *moonja* or culm of the *Sara* was made the *maunji*, or holy thread, ordered by Menu to form the sacerdotal girdle, in preference even to the *cusa* grass." The plant generally called *Moonj* is abundant along the banks of the Ganges at Hurdwar, and generally along the base of the mountains and up the vallies to 3500 feet; the brahminical thread called *juneo*, when first worn, is still formed of its fibre: and in connection with the constant use of the culm for arrows, may originally have represented the bowstring. It agrees best with Roxburgh's *S. Munja*, and at Hurdwar and in Gurhwal, is still commonly known by the Sanskrit term *sirkura*,—the origin of *sugar* in every language: the root being *sri*, to hurt. The application is not very clear, till we recollect the resemblance of the sugar-cane to *Saccharum Munja*, and the arrow-

shafts (*sura*) furnished by the latter : the weapon, therefore, preceded the luxury. The Sat or Kilk reed-pen is the culm of *Saccharum fuscum*, not *S. Semidecumbens*.

*Arundo?* *Khyla*. This reed is very common in Gurhwal, where also it is considered poisonous to cattle, and has the name of "Bichhra."

*Imperata cylindrica*. "Shiro," ascends to 7500 feet.

*Saccolabium papillosum* (*Cymbidium præmorsum* of Roxburgh) is the orchid which covers *Ulmus integrifolia*.

*Plectranthus ternifolia* : common in the *grass* Bhabur, and up the great vallies to 3500 feet.

*Stipularia flaccida*, (*Arenaria flaccida* of Roxburgh, who notes its resemblance to *Spergula arvensis*,) is abundant in the rubbee cultivation of the Bhabur.

*Albizzia* (*Acacia*) *stipulata* ; common in the forests of the outer ranges.

*Flemingia strobilifera* : open forests of the Bhabur.

*Sephalica*, p. 398. Neither *Vitex* nor *Nyctanthes* supplying the requisite conditions, a final attempt to identify the plant will be admitted. In Ward's *View of the Hindoos, Poetry*, part 3, Vol. II. 381, we have the following passage in an address to the "Koomoodu, which expands its flowers only in the night." "Thou dost not shew even thy face to the sun, yet thou renoucest not the bee (who lodges in thy bosom all night.)" Here, then, is a fact, real or poetical, involving the etymology of the term in question. Now Roxburgh (II. 577,) has Koomooda as the Sanskrit name of *Nymphœa Lotus* (*pubescens*) with white flowers, but the synonyme *Neelica*, as well as the *Umurkosh*, quoted by Sir W. Jones, implies that *blue* is the usual color : "When the *Sephalica* has white flowers, it is named *Swetasurasa* and *Bhutavesi*." (*As. Res.* IV. 258.) The probability therefore is that *Nymphœa cyanea* with "flowers beautifully azure," (Sir W. Jones,) or the blue variety of *Nelumbium speciosum* reported to exist in Cashmeer, is the plant originally intended. Sir William explains Koomooda to signify "Delight of the waters," which, though applicable to any beautiful aquatic plant, he would refer to *Menyanthes* (*Villarsia*) *indica* ; and we find *M. cristata* with "Koomoodwutee," "Koomoodinee," as its names, in the *Flora Indica*. The curled petals, and long white filaments of the corolla and nectary of these white-flowering plants, are

exactly such as the mountaineers of the Himalaya still designate by some term compounded of *Bhoot*, a goblin, a spirit : *Bhootkes*, "ghost's hair," being applied to several plants with finely cleft leaves and flowers, or furnished with copious long tomentum. *Swetasurasa* may denote 'like a white angel;' but Dr. Wilson says, "White Rasan," *Ophioriza mangos*, to which it is compared; a plant I am not acquainted with, nor is it certain that *Rasna* is properly so rendered. The synonyms of the *Umurkosh*, not at present within my reach, might tend to establish this identification; but, right or wrong, *Nyctanthes* is clearly excluded, being never blue: the Kumaon pundits all consider it to be the "*Parijat*," pared down to mundane attributes; in color of flower it comes near the *Villarsias*.

Several trees are to be found in the Sewalik and Bhabur of Gurhwal which have not hitherto been met with in Kumaon.

Such are *Pongamia glabra*, *Boswellia glabra*, *Cochlospermum gossypium*, *Feronia elephantum* and *Limonia crenulata*; the last suddenly makes its appearance in great abundance a few miles S. E. of Laldhaug: some of the others would not be recognized, being leafless all the cold weather. *Batis spinosa* (or *aurantiaca*?) the "*Kangoo*" and "*Manda*," of the Dehrah Doon, I have not seen S. E. of the Ganges. It has a fruit the size of a small custard-apple, repening in November, and not unlike the *Maclura aurantiaca* or Osage orange; while Roxburgh describes his with fruit the size of a pea. The natives of the plains generally mistake the Doon shrub for *Flacourtia cataphracta*, and call it *Puniyala* and *Puchnala*.

Bheemtal, p. 403, 404.

*Urtica* (not *Bœhmeria*) *frutescens*, "Poeë," "*Phoosur puta*;" it comes near *Urtica pulcherrima* of Roxburgh, and is common to the Ganges in Lower Gurhwal, where it is called "*Dhoula Kagshee*;" the "*Pooah*" of Nepal and Sikhim (also at p. 587.) *Vide Journal Agri. and Hort. Soc. Bengal*, Vol. VI. p. 135.

*Hedera elata*? tree of 30 feet, Sat Tal.

*Hedera terebiuthacea* (not *parasitica*: and also p. 352.)

*Casearia tomentosa*.

*Sabia paniculata* (not *campanulata*, which has *purple*, not *green* flowers, as represented by Dr. Wallich; it is very common in Kumaon: the drupes when ripe are of an ultra-marine blue.

*Biophytum sensitivum*, to 3500 feet.

*Commelyna Donii*.

*Uraria lagopus*.

*Pueraria tuberosa*, to 4500.

*Wendlandia puberula*.

*Sapindus acuminatus*.

*Clematis Gouriana*, to 4500.

*Adiantum lunulatum*.

*Dalbergia Ougeinensis*. To 5000 feet, and far up the great vallies.

The Vernacular Sanun,\* Sandun, Sunduni, &c., universally employed in the Bengal Presidency, are from the Sanskrit "Syundun," "Syunduni," "Syundan-droom,"—"tree of the war-chariot," indicating the use formerly made of the timber, which would probably be found an excellent material for the spokes and felloes of wheels, &c. It is still in high estimation in Kumaon, and many parties may be seen returning from their annual visit to the Bhabur with a small supply for their ploughs, &c.

The lake at Bheem Tal is 64 feet deep. (*As. Res. XIII. 309.*)

The following grow in or by it, in addition to those enumerated at p. 406:—

*Vallisneria spiralis*.

*Enanthe stolonifera*.

\* *Balanites Ægyptiaca*. The vernacular names indicate the Sanscrit Hingoo-putree and Hingoo-purnee, "asafetida leaf." I do not recollect the odour of the leaf, but "the pulp of the fruit has an offensive greasy smell." (Roxburgh.)

One or two more identifications of the vernacular with the classical may be added.

"Talisputra," "Mountain-leaf." A leaf used in medicine (Wilson) is probably *Rhododendron anthopogon*, well known to the mountaineers of Busehur as "Talsir." The leaves are much more aromatic than those of *R. lepidotum*, to which Dr. Royle refers "Taleesfur." "Chora," (*Wilson's Dictionary*.) Traill in *As. Res. XVII. 9*, is the ordinary term in Busehur and Gurhwal for Mr. Edgeworth's *Angelica glauca*; "Gundhrain" in Kumaon, and "Cheepee" of the Bhotias.

"Chumpa" is referred by Dr. Wilson to *Bauhinia variegata*, but is more probably *Michelia Kisopa*, *Doltsopa*, &c. which, with several *Magnolias*, are called Champ in Nepal and Sikhim.

"Toong," *Rottlera tinctoria*, according to Wilson, but in the British Himalaya universally used for *Rhus velutina* and *parviflora*.

*Pontedera vaginalis*, and at 5700 near Shamkhet.

*Potamogeton natans*, *perfoliatum*, *pectinatum*.

The plant which is entered *Scirpus lacustris*, grows 10 feet high, flowers in May, and is not to be distinguished from the English Bull-rush.

Shamkhet valley, p. 408. Here at 5500 feet, we have

*Thalictrum rupestre*.

*Michelia kisopa*.

*Hydrocotyle tenella* (Nepalensis.)

*Jasminum chrysanthemum*.

*Desmodium polycarpum*.

*Euphorbia hirsuta*.

*Potentilla nepalensis* and *splendens*.

*Rubus rotundifolius* (*Goureephul*), and an unknown species allied to it, but very green and glossy ; in shade only, to 7300, Gagur Pass, Binsur ; affinis provisionally, from its resemblance to *R. Goureephul* and *Wallichianus*.

*Agrimonia nepalensis*.

*Silene inflata*.

*Geranium Wallichianum*.

*Cedrela serrata*.

*Evonymus tingens* and *Hamiltoniana*.

*Ilex dipyrena*.

*Viburnum cylindricum*.

*Sedum multicaule*.

*Primula denticulata* and *speciosa*.

*Lysimachia debilis*.

*Androsace sarmentosa*.

*Elsholtzia polystachya*. } Scarcely under 7000 ft. at Simlah.  
*Senecio spectabilis*. }

*Echenais arachnoidea*.

*Barkhausia aspera*, at p. 434, this is erroneously marked N. S. ; it is the European plant, and is pretty common in cornfields and waste lands from this level to about 7500.

*Tulipa stellata*, at Sireenugur in Gurhwal ; this plant descends to 1800 feet ; the elevation of the Chirapanee Pass, estimated at 7000 feet, p. 578, is exaggerated ; the actual height by barometer is 6454.



Gagur Pass, p. 411.

*Rubus affinis* (Mihi) and another, unknown.

*Crassula indica* (not *sempervivum*.) Common at Simlah.

*Acar lævigatum*, common here; also on Binsur, and at Udwanee in Gurhwal.

*Viscum verticelliflorum*, on *Quercus incana*, to 7500.

*Loranthus vestitus*.

*Hypericum perforatum*.

*Symplocos nervosa*, (probably *S. sumuntia* of Don's *Prodromus*, and *S. lucida* of J. A. S. April 1833.) A small evergreen tree, common on the north side of the Pass, and in similar shady places on Binsur, Boora Pinnath, &c., and Punjok Khal in Gurhwal, from 6000 to 8000 feet. The leaves are beautifully glossy. *S. Loha* grows on Siyahee Devee.

*Lysimachia debilis*.

*Hedyotis Lindleyana*.

*Gardnera ovata*.

*Bryum serpyllifolium*.

*Dolichos glutinosus*, (nearly) at 6000 feet.

Ramgur valley, p. 416.

*Barleria cristata*.

*Verbena officinalis*. This may be adduced as another instance (p. 356) of an European species limited to the warmer region of the Himalaya, from 2000 to 7000 feet, so far as I have observed it. So we have *Geranium molle* in great abundance, associated with *Acacia Catechu*, at 1200—1500 feet, along the Ganges between Tupoobun and Deopryag, flowering in February.

Deodara Pass, p. 415.

*Buddlea crispa*, "Doosheria." The shrub so named, common everywhere from Busehur to Kumaon, at 5000 to 7500 feet, appears to be *B. paniculata* of Wallich (*Flora Indica*, I. 412) and Don, (*Prodromus*), *B. tomentosa* of Hamilton.

*Salix*, an arborescent species is common here between 5500 and 6500 feet, and in many similar shady localities in the province; it is diandrous, polyspermous (often 5,) with lanceolate leaves, glaucous and sericeous beneath. It is probably *S. cuspidata*, Don. *S. tetrasperma* fringes the Ramgur stream fully up to 5000 feet.

Peorah, p. 416.

*Viburnum cylindricum.*

*Disporum Pitsutum*, common also on Binsur, Siyahee, Boora Pin-nath and Fagoo.

The "Neoula" mentioned at p. 420, is *Bucco grandis*. The story goes that its lamentable cry is the expression of its feelings on the loss of a awsuit! The loud bell-note of another species (*B. caniceps*) is equally remarkable in the forests of the Bhabur. The cause of the Singor (*Athene Brodiei*), and generally of the owl family, making their appearance only by night, is explained in Kumaon by the legend, that having originally none of their own, they dressed themselves in plumes borrowed from all their neighbours; but repudiating this loan, are invariably chased and beaten by these latter whenever they venture abroad in the day time!

Almorah, pp. 423—445.

*Clematis gracilis*, Edgeworth, at 7500 feet on Binsur.

*Diclytra scandens*. Found at Bala Jagesur by Lieut. Strachey, at Mussooree by Mr. Edgeworth.

*Corydalis paniculata*, 3700 feet, is a misprint for 7300.

*Jasmiuum dichotomum*. Don. Bhyns Khet, near Hawulbagh, probably *J. angustifolium*, Roxb.

*Enanthe stolonifera*, (on the Suwal.)

*Ptychotis anethifolia*. "Dhunjurree."

*Hedera parasitica*. Binsur, at 7400 feet:—on *Rhododendron*.

*Hedera terebinthacea*. Kosilla.

*Ænothera grandiflora*, (not *longiflora*.)

*Berberis nepalensis*, "Chotura." In great abundance on Binsur\* from 7000 to 8000 feet. The "Jumne Mundroo" of Kirkpatrick's Nepal.

*Polygala Rothiana*.

*Juglans regia*, "Ukhor," a few trees wild on Binsur at 7500.

*Euphorbia angustifolia* (*dracunculoides*, Roxb.) From the Bhabur forests to 6000 feet; about which point it is succeeded by *E. hirsuta*.

\* A few plants, not met with elsewhere in the vicinity of Almorah, will be found referred to this mountain, a very fine one, close on 8000 feet elevation, about 12 miles from that station to the N. E. It separates the smaller affluents of the Kosilla from those of the Surjoo. There are several Binsurs and Binesurs in Gurhwal, all sacred to Mahadeva, probably as Bindh-eswur, "Lord of the Vindhya;" or Binaik-eswur, which is equivalent to Baal-peor.

*Leptopus* (*Phyllanthus*) *cordifolius*. (*Cluytia* of p. 426.)

*Silene conoidea*, abundant in the cornfields.

*Melianthus major*. A solitary plant of what seems to be this species has existed from time immemorial in the Government Tea Plantation, Hawulbagh, formerly the property of Sir Robert Colquhoun, from whom Dr. Wallich received a portion of his Kumaon specimens, and who has been accordingly commemorated by a genus of the Labiatae. In Dr. Royle's *Illustrations*, p. 154, we are told that the Doctor's plant collectors obtained a species of *Melianthus* on "the lofty mountains of Kumaon," and Dr. Lindley (*Vegetable Kingdom*) apparently alludes to this circumstance when he says that *Melianthus* is remarkable for being found both at the Cape of Good Hope and in Nepal without any intermediate station." (Dr. Royle, *Illustrations*, p. 25, mentions it as a plant not found in *Nepal*.) Now, a considerable number of these lofty mountains of Kumaon have been explored by Lieut. Strachey, Mr. Winterbottom, and myself, and we could scarcely have missed so conspicuous a shrub if it existed in any of the localities visited. So far therefore, as this negative evidence is of value, added to the probability of the Hawulbagh plant being one of the Cape species, introduced from Calcutta or Seharunpoor, the anomaly of geographical distribution is explained and removed. The Hawulbagh species has never flowered recently, and may be new, introduced from our lofty mountains; or it may be *M. major*, and quite unconnected with the specimens alluded to by Dr. Royle, but the presence with it of pear, apple, plum, and other fruit trees, and flowering shrubs, manifestly from some Botanic Garden in the plains, with the absence of all specification as to the site of Dr. Wallich's specimens, is suspicious; and "plant-collectors" are glad enough to load their Herbaria with garden specimens, and for the most part not enthusiastic at all in exploring "lofty mountains." About 3 years since *M. minor* was in flower in General Tapp's garden at Subathoo; and *Ulex Europæus* at Simlah; where his (native) gardener assured me the latter was from the interior. Both were undoubted exotics, introduced by the General. Dr. Wallich's collectors may have supposed the Hawulbagh *Melianthus*—if this be *M. major*, and supplied the specimens in question—to be indigenous; the question can only be set at rest by a comparison of these with authentic ones of the Cape plant. That the identical species should occur in both countries

is extremely unlikely; the Himalaya having otherwise only one representative of the order as defined by Dr. Lindley; viz., a species of tribulus, found and figured at Leeo in upper Koonawur, by Mr. Charles Horne, C. S.\* It should be added however, that Mr. Wm. Griffith (Journal of Travels, pp. 264, 265) mentions a *Melianthus* at 9500 feet near Jaisa, in northern Bhotan.

*Zizyphus jujuba.*

*Reseda odorata.* Becomes perennial at Almorah as at Algiers.

*Rubus tiliaceus.* "Kutrola," "Kutrota:" (*R. cordifolius*, Don.)

*Potentilla supina*, at 7400, on Binsur, and at Hurdwar.

*Potentilla Wallichiana*; a third species is undetermined.

*Indigofera polyphylla.*

*Flemingia nana*? Roxburgh; a small shrub, 3 to 5 inches high. Almorah.

*Flemingia procumbens*, Roxburgh, is no doubt the plant formerly entered here as *Dolichos*, "Mooskela." It is so called (mouse-plantain) from the form of its tubers, which are occasionally dug up and eaten by the poor. The plant reaches nearly to the summit of Luriya Kanta, and to 8500 feet, or more, near Nagkunda. I have not seen the deciduous calyx bracteoles mentioned by Roxburgh, and one of the two ovules seems generally abortive.

*Eriosema* ———. This is *Crotalaria tuberosa* of Don, *Pyrrhotrichia tuberosa*, W. and A.

*Urtica caudigera.*

*Ficus virgata*, (not *rotundifolia*.) "Beroo," "Bedoo." It is arborescent with ashy white bark and edible fruit, the size of a large gooseberry; and so far does not tally with Roxburgh's description.

*Aerua scandens* (not *lanata*.)

*Polygonum Posumbu* (Don.) near *P. barbatum*.

*Stephania Wightii.* *Clypea* of p. 431.

*Campanula canescens* (not *ramulosa*.)

\* In Mr. Horne's numerous and interesting drawings may also be recognized three other plants new to Himalayan Botany:—

1. A *Symphytum*, at Bhyroo Ghattee on the Bhagiruthee.
2. *Calystegia sepium*, at Reeba in upper Koonawur.
3. *Tamus* (like *Cretica*) at Rukchum on the upper Buspa.

*Campanula agrestis*. Wallich, Kosilla and Suwal at 4000.

*Oreoseris gossypina* (not *lanuginosa*.)

*Spermacece lasiocarpa* (not *stricta* : but very like it.)

*Cyathocline lyrata* : *Tanacetum purpureum*. Don's Prod.

*Inula vestita*, rare and dwarfed.

*Blumea interrupta* ; N. S., extremely fragrant.

*Erigeron Roylei* (not *Aster bellidifolia*.) "Murch-mool."

*Amphirapis pubescens* (*Solidago Nepalensis*, Don.)

*Bidens Wallichiaua*. The species so named here, may possibly be new : *B. gigantea*, as it is from 6 to 8 feet high near Bagesur ; occurs from the base of the mountains to 7500.

*Tricholepis elongata* : (not *reticulata*.)

*Thesium Himalense*, (Royle,) common at 6500 feet on Binsur.

*Ixeris hastata*. Binsur, 7500. Common at Lohba House, Gurhwal, 5500.

*Galium ciliatum*, Don. Binsur, 7300.

*Dipsacus inermis*.

*Mæsa argentea*. "Phoosera." 5500. Western glens of Binsur.

Fruit edible.

*Cynoglossum prostratum*, Don.

*Orthosiphon virgatus*. Common on the Kosilla.

*Leucas hyssopifolia*, (not *Indica*.)

*Zapania nodiflora*, to 4500.

*Premna herbacea*, (not *barbata*.)

*Linaria ramossima*, (not *incana*.)

*Wulfenia Amherstiana*. Common on Binsur at 7000 to 7500.

*Scrophularia obtusa*, N. S. near *auriculata*, p. 435.

*Leptorhabdos* (*Sopubia*) *parviflora*. Binsur, 6500.

*Sopubia scabra* v. *trifida*, (not *Gerardia delphinifolia*.) Common on warm grassy slopes at 6000—6500, from Simlah to Almorah.

*Pergularia pallida*. Kosilla, at 4000.

*Crinum toxicarium*. "Chundur-Kouwul" of p. 437.

*Phoenix humilis*? on very warm aspects this, in a very dwarfed state, reaches 7000 feet on Binsur. The fruit ripens at Almorah in July, and is then of a black, purple color. What little pulp there is, is sweet and the dates are eaten by the poor. In their color, that of the spadix, and minor points, the fructification bears a



very close resemblance to *Phoenix Sylvestris*, as described by Dr. Griffith, (*Calcutta Journal of Nat. Hist.* No. 19,) who was evidently inclined to consider this last, *Ph. acaulis*, and *Ph. dactylifera* but as gradations of one form.—Such a view seems very probable from the apparent impossibility of finding good characters to define these so called species.

*Uropetalum*. So Mr. Edgeworth thinks the blank may be filled up, line 7, p. 438.

*Juncus dichotomus* (not *bufonius*.)

\**Commelyna salicifolia*.

*Remusatia capillifera* (not *vivipara*.) See ante.

*Pothos decursiva*? “*Kelounia*.” A very handsome species, at about 4000 feet, east face of Binsur.

*Andropogon Calamus-aromaticus* (or *Martini*.) This plant is called *Rhoonsee* in central India, and it is curious that at Syree (below Simlah) where it is abundant, the name is “*Reoonsh*,” and “*Dig-reoonsh*.”

*Anthlisteria arundinacea* to 4000 on the Suwal.

*Manisurus granulatus*.

*Leptothrium Roylei*.

*Pogonantherum polystachyum*.

*Spodiopogon laniger*.

*Brachypodium Nepalense*.

*Fimbristylis communis*.

*Mariscus cyperinus*.

*Trichelostylis junciformis*.

*Kyllingia multiceps*.

*Cyperus Iria*.

*Cyperus tegetum*. (*Papyrus pangorei*?) is the plant entered as “*Motha*,” p. 440. It occurs wild, but is also cultivated on the bor-

\* In the original paper, *Murdannia scapiflora* is inserted here, I suspect erroneously. The plant intended scarcely descends below 5000 feet, flowers in August with leafy scape, and is probably *Aneilema longifolia*. It is common along the Gagur range, up to 7000 feet, and is also found at Simlah and Mussoree. *Murdannia scapiflora*, on the other hand, flowers in May with a leafless scape, and does not, to my knowledge, ascend above 4000 feet, as at the Sat Tal, near Bheem Tal. The flowers are very like, and Dr. Royle (*Illustrations*, p. 403,) appears to consider the plants identical.

ders of inundated fields for the sake of the very durable mats made of its culms.

*Botrychium lanuginosum.*

*Sinapis*, pp. 441, 442. Vide corrections ante, p. 619.

*Amaranthus farinaceus*, (not *anardana*.)

*Amaranthus caudatus* (not *speciosus*.)

*Cucurbita citrullus*, "Turbooz." Not common.

*Dolichos sinensis*, "Lohbia." Gardens. During powerful sunshine, the leaflets of *D. catjang* may be observed in motion much like that of *Desmodium gyrans*.

*Soja hispida*, "Bhut." This pulse, though reckoned unwholesome, and only consumed by the poorest classes, is extensively grown in Kumaon, and is evidently of old standing, as many leguminous shrubs; *Desmodium*, &c., take their names "Bhutola," from it, as others, "Guhutya," from *Dolichos uniflorus*. The cultivation of *Soja* extends, I am assured, to Nepal and the north of Tirhoot, under the name of "Bhutnas" or "Bhutwas;" a circumstance not noted in our books on their agriculture.

P. 448, *Acacia dumosa*. This shrub, or small tree, not observed elsewhere in Kumaon, is common in Gurhwal up to the Ganges, and appears to be confined to the banks of the streams and rivers where they enter the plains and Doons. It is generally known by the same names, Keekur and Bubool, as *A. arabica*. The pinnæ are 3—5, the leaflets 4—10; glands various, and in its young branches, petioles, thorns, very villous with rufous down. It disagrees with the account in W. and A.'s *Prodromus*. The flowers are white, probably in December or January; it is in young fruit in February. The peduncles solitary or in pairs, equal to, or twice as long as the leaves, with umbel of 3—7 legumes; 5—8 seeded, flat, smooth, linear, nearly straight, pendulous, 3—5 inches long, by less than a quarter of an inch broad; the border with a long shallow sinus between each seed. This form seems the main difference from *A. latronum*.

Burmeo and Poonagiri, p. 571.

*Wendlandia puberula*.

*Bambusa stricta*, Roxb. is the common species of the Turæe and lower mountains.

*Briedelia scandens*, reaches the Suniya jungles.

Chhirrapanee, p. 578.

*Eria convallarioides* (*Octomeria spicata*, Don.) “Guroor-punja,” it abounds in Kumaon on *Quercus incana* up to 7500 feet.

*Androsace sarmentosa*, not *lanuginosa*, is the plant which occurs here, and in all equivalent localities. *A. lanuginosa* is found at great heights along the snowy range from Busehur to Kumaon. Each plant is sarmentose and woolly, and Don has confounded them.

Ramesur, p. 586.

*Saurawja nepalensis*: bis, p. 589. *Sauravia* is a misprint.

*Cantharospermum*, a great climber, with yellow flowers in February, March, occurs here and in the forests of the Bhabur to Hurdwar.

Gungolee Bridge, p. 587.

*Wendlandia exserta*, var.

*Pittosporum floribundum*.

*Lysionotus serratus* (or *ternifolius*), a common shrub on the Surjoo nearly up to Kupkot.

*Evonymus virgatus*, N. S.

*Ceanothus micropetalus*, N. S.

*Ocotea lanceolaria*.

*Tetranthera Roxburghii*. “Gur-beejour;” from some resemblance of its leaves to those of the citron.

*Urtica frutescens* (not *Bœhmeria tenacissima*.)

*Blumea laciniata*, vel N. S. *procera*.

*Rhabdia sericea* (Edgeworth.) This shrub, which is procumbent, with stems as thick as one’s wrist, and 5 to 6 feet long, abounds in the bed of the Surjoo from this spot to the junction of the Reethagar stream, abreast of Binsur, and probably considerably farther in each direction. Mr. Edgeworth, about the same time, discovered another species in the Cane river near Banda, the genus being previously unknown in India.

*Acacia Smithiana*.

*Hymenodictyon flaccidum*.

*Indigofera trita*.

*Desmodium reniforme*.

*Geniosporum strobiliferum*.

} By Lieutenant Strachey.

The “Roogee” mentioned at p. 588, is not an *Actæa*, but belongs to an order intermediate between *Cruciferae* and *Papaveraceae*; and to a

genus which Mr. Edgeworth proposes to name "Stracheya," after Messrs. John and Richard Strachey, who first discovered the plant near the sources of the Pindur. It is not uncommon at similar altitudes (12000 feet) on the Gauree to the eastward; and Mr. Winterbottom found it, or a very similar species, on the lofty passes between Kashmir and little Tibet. Raised from seed or imported mature from the Himalaya, it speedily perishes at Almorah.

P. 590. *Rhynchosia pseudo-cajan*. "Shialee," "Phoosur-puta."

P. 595. *Chamærops*. The actual stature of this Palm on Thakil mountain is here considerably underrated. In December 1848, Mr. Winterbottom, without searching out the loftiest trees, measured one, the bole of which was 46 feet, 4 inches, with a crown of perhaps  $3\frac{1}{2}$  feet more; another stem was  $36\frac{1}{2}$  feet, and no doubt some attain 50. Mr. W. was fortunate enough to visit the spot when these Palms were covered with snow. Dr. Hoffmeister mentions this *Chamærops* on Dhunpoor in Gurhwal.

P. 607. The bitter *Olea* mentioned here is probably *O. compacta*; it is common by brooks in the warmer vallies of Kumaon and Kyoonthul, (Simlah.)

*Clematis montana*. This species is abundant in Kumaon and Gurhwal at 6500 to 7000 feet, where it apparently disappears, but only to be replaced by what may be considered a variety, becoming however, more and more luxuriant till, at 8000 feet, Fagoo woods, and 10,000 feet elevation on Doodootolee mountain in Gurhwal, and others in Kumaon, it attains its maximum, climbing 20 to 30 feet up *Abies Webbiana*, which it covers with sheets of large blossoms, of the purest white, with the fragrance of Meadow-sweet; variety or species, it is the handsomest of the genus.

Near Somesur, p. 610.

*Mimulus gracilis*. By water-courses.

Boora-Pinnath, p. 614.

*Evonymus echinatus*, is the blank species; *E. japonicus* is now considered to be distinct, and is named by Dr. Wallich *pendulus*; a tree of 40 feet, with yellow bark like *E. tingens*.

*Vincetoxicum Kunawarensis*, 9000 feet.

*Orobanchaceae aurantiacus* (not *luteus*.)

*Pyrus vestita*. This is the tree which, at Diwalee, (J. A. S. March

1847, p. 246,) under the name of "Moulee" is named *P. crenata*: and Loudon (*Arboretum* II. 912,) is inclined to identify *crenata* of Don, with *vestita* of Wallich. The same name is applied to this species N. W. to Busehur, by the population immediately next the Himalaya, who, in all this tract, appear in many cases to have preserved the same, or but slightly modified names for the same plants; from which may be inferred identity of race. In the lower provinces of the mountains, on the other hand, the case is very different; more open to invasion, though scarcely more worthy of it, the population has been more mixed, and the dialects so altered that very few of the vernacular terms for plants proper to Simlah are in use at Almorah.

P. 618. *Symplocos paniculata* (not *racemosa*, which does not appear to ascend the mountains.)

P. 625. *Ligustrum bracteolatum*, is a common shrub in the Sutrale valley, at 4500 feet, and follows the course of the streams up to 7500, on Binsur.

The subjoined errata of the press require correction:—

|        |     |   |       |        |            |                                                    |
|--------|-----|---|-------|--------|------------|----------------------------------------------------|
| P. 350 | L.  | 9 | for   | 400    | read       | 4000.                                              |
| "      | "   | " | 23    | insert | comma      | after <i>Gagur</i> , period after <i>Chilkia</i> . |
| "      | "   | " | 27    | "      | space      | " span.                                            |
| "      | 360 | " | 6     | for    | fullest    | read falsest.                                      |
| "      | 367 | " | 35    | "      | pointed    | " painted.                                         |
| "      | 376 | " | 7     | "      | Tiaree     | " Jiaree.                                          |
| "      | 411 | " | 31    | "      | barbatella | " barbellata.                                      |
| "      | 418 | " | 14    | "      | forms      | " ferns.                                           |
| "      | 423 | " | 31    | "      | 3700       | " 7300.                                            |
| "      | 434 | " | 24    | "      | Feewae.    | " Heewae.                                          |
| "      | 437 | " | 10    | "      | 2500       | " 1500.                                            |
| "      | 440 | " | 23    | "      | Tsolepis   | " Isolepis.                                        |
| "      | 571 | " | 18.21 | "      | following  | " foaming.                                         |
| "      | 572 | " | 16    | "      | deserted   | " desecrated.                                      |
| "      | 577 | " | last  | "      | Bunlouree  | " Bumouree.                                        |
| "      | 599 | " | 27    | "      | and        | " or.                                              |
| "      | 600 | " | 12    | "      | from       | " form.                                            |
| "      | 602 | " | 1     | "      | crossing   | " cropping.                                        |
| "      | 607 | " | 31    | "      | that       | " That ( <i>a village</i> .)                       |
| "      | 616 | " | 10    | "      | stories    | " stones.                                          |
| "      | 618 | " | 21    | "      | Doonagiri  | " Poonagiri.                                       |



*Identification of the plants found by Major General Hardwick between Hurdwar, Kotdwara and Sreenugur, in the year 1796, as detailed in the sixth volume of the Asiatic Researches :—*

MONANDRIA MONOGYNIA.

*Costus speciosus.*

*Curcuma (angustifolia.)*

*Diandria monogynia.*

*Jasminum 1, (dichotomum of Don, angustifolium, Roxb.)*

*Jasminum 2, (arborescens.)*

*Jasminum 3, (chrysanthemum, Roxburgh, and revolutum, Don : very probably also J. inodorum of Jacquemont ; J. Jacquemontii, De-caigne, and J. chrysanthemoides of Royle.) Hemapooshpika, Sanscrit, Sona-jahee, or Golden Jessamine of the Vernacular. It occurs from 5500 to 10,000 feet above the sea, and varies considerably in the size of the leaves, the position of the stamens, &c. The former, as well as the corolla, are ciliate.*

It may be necessary to mention that the Udwanee mountain, where the General found this and so many more of his plants, is the highest range between Kotdwara and Sreenugur, being about 12 miles S. S. W. of the latter (direct distance) and 7151 feet above the sea, at Ranee-gurh, the Trigonometrical station.

*Justicia (Phlogacanthus) thyrsiflorus.*

*Salvia integrifolia (lanata.)*

TRIANDRIA MONOGYNIA.

*Valeriana (Hardwickii.)*

TETRANDRIA MONOGYNIA.

*Ixora tomentosa.*

PENTANDRIA MONOGYNIA.

*Androsace rotundifolia.* (No doubt the General intends the perennial pink species flowering all the year : not Dr. Wallich's white flowering annual, *A. incisa*, which alone descends to the Turæe, flowering only in the cold season and spring. Don (Prodromus) confounds the two, and I believe that in Europe, the specific names are erroneously reversed.)

*Lonicera quinquelocularis, (diversifolia of Wallich,)* which never climbs. no other species grows near Udwanee, and this, except in wanting the 5-celled ovary, perfectly agrees with the combined character by Rox-

burgh and Hardwick: the General was inclined to identify his plant with Dr. Wallich's *L. ligustrina*, but may have intended the next species, *L. diversifolia*, procured from Gurhwal. The 5-celled berries would, taken alone, indicate *Leycesteria formosa*, but there the resemblance ceases; and Dr. Wallich would at once have recognised that shrub in the General's drawing; nor could I discover it anywhere in the Udwance vallies, where *L. diversifolia* is abundant. The general may easily have mistaken the number of cells in a very immature berry, which, in that stage, much resembles a capsule, and has certainly at least 3 cells occasionally. Dr. Wallich's name being rather inappropriate, the shrub might be well called *Lonicera Hardwickii*.

*Verbascum Thapsus*.

*Datura stramonium* (alba.)

*Ehretia tinifolia* (serrata.)

*Ventilago* (maderaspatana.)

*Celastrus scandens* (nutans.)

*Celastrus* 2, (not identified: *C. montanus* or a species very like it, is common at such elevations, 4500 ft., all along the mountains.

*Cedrela* (Tuna.)

Doubtful genus coming near *Hirtella*, (probably *Embelia picta*: compare *Celastrus rufus*, Wallich)

*Vitis* (lanata.)

*Gardenia* (*Randia*) *uliginosa*.

*Gardenia* 2, (*Randia longispina*.)

*Gardenia* 3, (*Randia tetrasperma*: *G. densa*, Wall.) Both descriptions are of shrubs eaten down by goats: when uninjured, *R. tetrasperma* assumes a very different appearance, by no means dense, and 10—12 feet high. The flowers are *terminal*. It is probably *Gardenia rigida* of Don's *Prodromus*.

*Nerium* (*Cryptolepis*), *reticulata*.

*Nerium* 2, (*Wrightia mollissima*.)

*Echites antidysenterica*, (*Holarrhena pubescens*.)

Genus not determined, (*Evonymus tingens*.)

PENTANDRIA DIGYNIA.

*Apocynum*, (*Vallis dichotoma*.)

*Asclepias*. Doubtful. (*Hoya viridiflora*.)

*Herniaria*. Doubtful. (*Deeringia celosioides*.)

*Gentiana nana*, (marginata.)

PENTANDRIA TRIGYNIA.

*Gouania nepalensis*, Wallich. The General's description is imperfect, and even erroneous, but from its abundance, there can be little doubt this is the shrub intended.

PENTANDRIA PENTAGYNIA.

*Linum trigynum*: shrubby, grows to be a spreading bush, about 4 feet high. Stem and branches erect. (This shrub is common everywhere from the base of the mountains to above 7500 feet, where it disappears. Except in the pale sulphur-yellow, and delicate fragrance of the flowers, it differs in no way from the shrub of our Indian gardens. Wight and Arnott suppose the Bengal and Nepal plant to be *L. repens* of Don, and so it is no doubt, the latter species being constituted solely from its appearance on the banks and terrace walls, where it is annually (with other shrubs) clipped down by the cultivators, as well as constantly nibbled by the cattle; the natural position is erect, and the height is sometimes 6 to 7 feet. Dr. Royle is inclined to consider *L. cicanoba* as a probable variety of *L. trigynum*, and Mr. Bentham to identify the last with *repens*: we have then only left, *L. tetragynum*, which is assuredly a mere accident; 5 or more styles being occasionally met with, either free or in various stages of cohesion up to the "semi-trigynum" of Hamilton.

HEXANDRIA MONOGYNIA.

*Berberis ilicifolia*, (identified by Roxburgh with his *B. asiatica*. From the Kali to the Bhagiruthi there is certainly no species which can be mistaken for it; and unless an abrupt change occurs at Mussooree, it is *B. lycium* of Royle. The latter however is well known there by the name "Kingora," which is also the designation of *B. asiatica* S. E. to the Nyar, where, as in Kumaon, Kilmora becomes the term used. *B. aristata* occur on Udwanee, but the General does not appear to have discriminated it.)

HEXANDRIA TRIGYNIA.

*Rumex Ægyptius* (Wallichianus), and *acetosella* (hastatus. The last occurs from the foot of the mountains to 8500 feet, and perhaps higher.)

OCTANDRIA MONOGYNIA.

*Polygonum convolvulus* (pterocarpum.)

ENNEANDRIA MONOGYNIA.

*Laurus cassia* (cinnamomum albiflorum.)

DECANDRIA MONOGYNIA.

*Bauhinia scandens* (Vahl.)

*Bauhinia variegata*.

*Guilandina moringa*, (*Moringa pterygosperma*.)

*Murraya exotica*.

*Melia azadirachta* (probably the Bukayun, not the Neem, is intended, the last is rare in the forests ; indeed I did not observe it at Kotdwara, where the Bukayun is common, though perhaps not wild. Notwithstanding all that Dr. Royle has written on the subject, it seems quite unnecessary to make the "Bukayun" a new species of *Melia* ; it agrees perfectly with the *Melia azedarach* of Roxburgh, Wight and Arnott, and Loudon's *Encyclopædia*, where the description of the drupes tallies with Dr. R.'s account (p. 141, Illustrations) of the Bukayun ; and certainly the tree of Provence, Egypt, &c., is no other ;—nor do the people of northern India generally (and apparently of Nepal) know of any other. Munshí Murdan Alí, of Seharunpoor, informs me that the "Dek" is a mere variety, only differing from the Bukayun by a more spreading habit, which gives less shade ; and one of the Seharunpoor gardeners now employed at Hawulbagh, on being asked what was the "Dek," pointed at once to the Bukayun, which I have heard termed "Dykna" in Gurhwal, and "Jek" near Simla. The size, as well as the form and number of the leaflets on each pinna of the Bukayun differ so considerably even on the same branch, as to remove any reliance on this kind of test ; and yet it so happens that Messrs. Weight and Arnott found Roxburgh's own specimens of *M. azedarach* and *sempervirens* so much alike as to appear as if cut from the same tree. "Dr. Roxburgh also states the *Bukayun* to be a native of Persia, though common throughout India, and that its Arabic name is *Ban*. This, in addition to the specimens in the East India Herbarium, perfectly identifies his plant with that of northern India." (Royle.) But the plant so named by Roxburgh is his *Melia sempervirens*, "a small, delicate, evergreen," which is certainly unknown in northern India, and, from the silence of W. and A. apparently equally so, in the south. Roxburgh found his plant to coincide with those raised from West Indian seed of *M. sempervirens*, which however, so far from being a small evergreen, is said in Loudon's *Encyclopædia*, to be a tree

of 40 feet, considered by some only a variety of the azedarach." Assuredly no tree is less entitled to the epithet of "sempervirens" than the Bukayun, which for 3 or 4 months annually, is the most marked of the deciduous trees of northern India. The same species may be evergreen in the damp and equable temperature of the West Indies; and, if we suppose Dr. Roxburgh to have made his descriptions from very young plants (which in many species are more or less evergreen,) his *M. sempervirens* may be accounted for. He states it to be "common throughout India," and to blossom more or less throughout the year, which is another difficulty, the Bukayun being very periodical, and flowering at Almorah, for example, in April, May or a month later than at Meerut.

I cannot find that Dr. Roxburgh identifies his *Melia azedarach* with the "Dek," as distinguished by Dr. Royle from the "Bukayun," nor that he had ever heard of such a tree. However, as Dr. Royle has done so; and as the Bukayun also answers to the description of *M. azedarach*, the only conclusion is that they are one and the same, which is the common opinion in northern India. The Bukayun is a smaller tree than the Neem, and as *muha* denotes *best, excellent*, as well as *great*, *muha-neem* must apply to its blossoms and their odor, rather than to its dimensions, possibly also to the extreme bitterness of the bark, an infusion of which is used in the mountains to expel leeches.

The expression "spreading tree" used by General Hardwick for the *Melia* of Kotdwara is exceedingly opposite to the Bukayun, and is an exact translation of the Persian "Azad-i-durukht," as well as of its Sanscrit equivalent, "Nibundh." The vernacular terms "Bakarjun" of Bengal, and "Bukayun" of Hindoostan, are to be traced in the Sanscrit roots *vuk, vukr*, bent, crooked (boughs,) and afford some proof that the tree is indigenous to India, but in Kumaon at least it never occurs to my knowledge but in spots near which it is likely to have been planted. The people, however, have their own name for it—"Betain." The fruit remains on the tree a full year, untouched by beast or bird excepting the Bulbuls, (*Ixos jocosus*,) who may be observed devouring it with avidity, and thus perhaps it has been scattered so far as to induce in some a belief that it is indigenous, as indeed it may be.)

Doubtful, (*Garuga pinnata*.)

Doubtful, (*Rhododendron puniceum*, Roxb. *arboreum*, auct.)



*Arbutus*, doubtful. (*Andromeda ovalifolia*, *Arbutus herpetica*, Roxb.)

DECANDRIA TRIGYNIA.

*Banisteria Bengalensis*. (*Hiptage madablota*.)

DECANDRIA PENTAGYNIA.

*Spondias myrobalanus* (*mangifera*.)

*Sedum album* (*adenotrichum*.)

*Oxalis acetosella*. On the heights of Chichooa, on a small spot of pasture. (Dr. Griffith found it near Tongsa in Bhotan; *Journals of Travels*, p. 268. Lieut. R. Strachey at Diwalee and other spots in northern Kumaon; and I have lately seen it in abundance at Ludoolee Ghat, at 7000 feet elevation, on the S. W. face of Doodootolee mountain, 6 or 7 miles from the source of the Nyar river. It flowers in March and April, and is undistinguishable from the English wood-sorrel.)

*Cerastium alpinum*, (*triviale*.)

Doubtful, (*Dentzia staminea*, very like *D. scabra*.)

DODECANDRIA MONOGYNIA.

*Cratæva tapia*. (*Ægle marmelos* or *Cratæva nurvala*. Both occur, the first very common. *Grislea tomentosa*.)

DODECANDRIA TRIGYNIA.

*Euphorbia canariensis* (*pentagona*.)

ICOSANDRIA MONOGYNIA.

*Punica granatum*.

*Prunus*. (*Cerasus Pudum*, *Prunus sylvatica*, Roxb.)

ICOSANDRIA DIGYNIA.

*Cratægus*. (*Cotoneaster microphylla*, Roxburgh's *cratægus integrifolia*.)

ICOSANDRIA PENTAGYNIA.

*Pyrus* (*variolosa*.)

*Spiræa* (*chamædrifolia*.)

ICOSANDRIA POLYGYNIA.

*Rosa* (*Brunonis*.)

*Rubus* (*Gouree-phul*, Roxb., *rotundifolius*, Wall., *flavus*, Don. The name *Gouree-phul*, signifying claret-purple fruit, is only used in Gurhwal by the pilgrims from the plains to Budreenath, &c. The mountain name is "Heesura" or "Heesur" in Gurhwal, and, more correctly "Heesaloo" in Kumaon and Ayshala in Nepal, according to Don, *Esealoo*, of

Aikin, from the Sanscrit *hinsaloo*, hurtful, mischievous. So, in northern India another thorny shrub, *Capparis sepriaria*, is called *Hins*, and *Heengs*, from the same root, *his*, to hurt. *Hinsuna*, *Abrus precatorius*, (Wilson) is therefore, perhaps, more properly *Capparis sepriaria*. *Heesaloo* is *R. rotundifolia* especially, the black, orange, and other species are descriminated as *Kulia*, *Jogia-heesaloo*, &c.

*Rubus idæus*, (identified by Roxburgh with his own *rosæflorus*, *distans*, Don ; *R. lasiocarpus*, Smith. If I am right in identifying it with *R. distans* of Don, it is the only species of Himalayan *Rubus* common to the plains and mountains, being found in the open country at Chilkya, and as high as 7500.feet. *R. goureephul*, descends to, but does not quit the base of the mountains.)

*Fragaria sterilis* (indica, W. and A. very near *F. Malayana*, Roxb. but the peduncles are usually leaf opposed. It grows up to 8000 feet.)

*Potentilla fragarioides*, (a species common in Gurhwal and Kumaon ; not determined, but near *P. Leschenaultiana*.)

*Potentilla reptans* (Wallichiana.)

POLYANDRIA MONOGYNIA.

*Lagerstroemia montana* (reginæ.)

Doubtful. (*Symplocos cratægoides*, *paniculata*, Wall.)

POLYANDRIA POLYGYNIA.

*Uvaria* (tomentosa.)

DIDYNAMIA GYMNASPERMIA.

*Ballota* (*Roylea elegans*.)

DIDYNAMIA ANGIOSPERMIA.

*Bignonia chelonoides* (suaveolens.)

*Gmelina arborea*.

*Volkameria* ? *bicolor* (*Clerodendron odoratum*.)

*Vitex trifolia*, (negundo.)

MONADELPHIA MONOGYNIA.

*Careya* (arborea, v. *pomifera*.)

MONADELPHIA DECANDRIA.

*Geranium* (*bicolor*, Royle, and probably *ocellatum*, Decaisne.)

MONADELPHIA POLYANDRIA.

*Bombax Ceiba* (malabarica.)

*Bombax* (*Cochlospermum*) *gossypium*.

DIADELPHIA DECANDRIA.

Robinia 1 (*Pongamia glabra.*)

Robinia 2 (*macrophylla.*)

Robinia 3, doubtful. (*Pueraria tuberosa.* The Kumaoon terms for this plant all refer to the cat, as Billee, Bilæe-kund, Biralee-poua :— “cat-root,” “cat-cake,” but *why*, is difficult to say. Its host of Sanscrit names have no reference to this animal.)

*Pterocarpus* (*Dalbergia sissoo.*)

POLYADELPHIA POLYANDRIA.

*Hypericum* (*cernuum.*)

SYNGENESIA POLYGAMIA ÆQUALIS.

*Prenanthes* (not recognised, but probably a species of *Conyza.*)  
(*Leucomeris spectabilis.*)

*Leontodon taraxacum* (*eriopus.*)

*Hypochæris glabra* (*Ammoseris patens?*)

*Hypochæris radiata* (*Tragopogon gracile?*)

SYNGENESIA MONOGAMIA.

*Lobelia Kalmii.* (*Pyramidalis.*)

*Viola palustris.* (*Patrinii.*)

*Impatiens noli-tangere.* (*Himiltoniana?*)

GYNANDRIA DIANDRIA.

*Limodorum* (*Apaturia Smithiana?*)

*Epidendrum* 1, (*Saccolabium guttatum*, or *papillosum*, or both.)

*Epidendrum* 2, (unknown.)

GYNANDRIA DECANDRIA.

*Helicteres isora.*

GYNANDRIA POLYANDRIA.

*Grewia* 1, (*sclerophylla.*)

*Grewia* 2, (*elastica.*)

*Pothos* (*officinalis.*)

MONÆCIA TRIANDRIA.

*Phyllanthus grandifolia* (*Emblica officinalis.*)

MONÆCIA TETRANDRIA.

*Betula*, (*Alnus nepalensis*; according to General H. the leaves are “ovate, obtuse;” Roxburgh says “some obtuse, some pointed.” Certainly the same species is found from the Sutluj to the Kalee, *A. obtusifolia* of Royle: but probably *A. nepalensis* of previous writers. “The bark is an article of trade into the plains of Hindoostan, said to

be used by the manufacturers of Chintz to dye red, known by the name of *Atees*." Hardwick, who so far justifies Dr. Wilson under Utivisha. But the Gurhwal term is "Ootees."

*Cicca disticha*. *Averrhoa acida*, Linnæus. *Phyllanthus (longifolia)* Roxburgh. (The General writes as if it were wild, but I never met it in the mountains wild or cultivated.)

*Morus* 1, (*serrata*, Roxb. *pabularia*, Decaisne. It is diœcious.)

*Morus* 2, (*indica*.)

*Morus* 3, (*serrata* : but mentioned as if monœcious.)

MONÆCIA POLYANDRIA.

*Quercus (incana)*.

*Juglans regia*.

*Carpinus*, doubtful. (*Engelhardtia Colebrookiana*.)

MONÆCIA MONADELPHIA.

*Pinus Tæda (longifolia)*.

DIÆCIA DIANDRIA.

*Salix (tetrasperma)*.

DIÆCIA PENTANDRIA.

*Xanthoxylon (alatum)*. This is probably the "Iwurantika" or *Fever-dispeller*, of the Indian *Materia medica*, explained by Wilson as a kind of *Neem* from Nepal ; which is a tolerable botanical definition as lexicons go. It is still known as "Jubrung" in Assam ; Griffith. "Tejbul," the designation in the N. W. Himalaya, is from the S. Tejovutee, "a plant bearing a fruit resembling pepper," from *tejus*, pungency. The capsules are considered very cooling.

*Cannabis sativa*.

DIÆCIA DODECANDRIA.

(*Tetranthera monopetala*. Roxburgh.)

POLYGAMIA MONÆCIA.

*Terminalia alata-glabra (tomentosa)*.

*Mimosa (Acacia) catechu*.

*Mimosa* 2, near *Lebbeck*. (*Acacia*, now *Albizzia stipulata*, rather common at the base of the Kumaon and Gurhwal mountains, as well as in the warm vallies.)

POLYGAMIA TRIÆCIA.

*Ficus laminosa*, (common on the rocks by the river banks, at from

1500 to 2500 feet above the sea, from Burmdeo to Tupoobun on the Ganges.)

Ficus 2. (Luducca of Roxburgh; common about Almorah as "Kabra.")

Ficus 3. (Chincha, Roxburgh, also common as a shrub in Kumaon, in the low vallies, and in the forests at the foot of the mountains, it becomes a small spreading tree, probably the *F. squamosa* of Roxburgh.)

Ficus 4. (Macrophylla.)

Kaiphul. (*Myrica sapida*. From some external resemblance in fruit, the strawberry has its mountain name of "Kuphulia.")

Place unknown, Linnæan system.

*Sterculia villosa*. The "Ooddal" of Kumaon, (Gooddala of Gurhwal,) and known by the same name down to Assam; the inner layers of the bark making excellent rope. (Griffith, in J. A. S. April 1839.) We have also in the Catalogue of woods, J. A. S. for April 1833, *Odda* given as the Gwalpara name of *Sterculia urens*, the bark of which is there said to afford a coarse rope used in catching wild elephants. Most probably alluding to the "Oodal" of Assam, *Sterculia villosa*, vide Journal of Agri. and Hort. Soc. of Bengal, Vol. VI. 139. The word is Sanscrit, and is explained by Wilson, *Cordia myxa* or *latifolia*; but the etymology from *Ood*, large, and *dul*, to split, tear, divide, must strike every one who sees the process as a strong presumption in favor of the existing usage of the term. In Khurwa-ooddal, Kumaon, Khurdala, Gurhwal, we have a modification of the term to express Dr. Royle's yellow variety of *Sterculia coccinea*.



PROCEEDINGS  
OF THE  
ASIATIC SOCIETY OF BENGAL  
FOR JUNE, 1849.

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At a meeting of the Asiatic Society held on Wednesday, the 6th June, 1849,

The Hon'ble Sir J. W. COLVILLE, President, in the chair.

The President stated what had been done in consequence of Mr. Laidlay's illness, and communicated the proceedings of the meeting of the Council held 4th of June, 1849, as follows :—

At a meeting of the Council convened for the purpose of considering what measures should be adopted for the conduct of the affairs of the Society and the editorship of the Journal, in consequence of the illness of Mr. Laidlay, The Hon'ble Sir J. W. Colville, President, in the chair, it was resolved,

1st. That Dr. McClelland be requested to undertake the editorship of the Journal, until the return either of Dr. O'Shaughnessy or Mr. Laidlay.

2nd. That Dr. Walker be requested to perform the other functions of Secretary of the Society, until the return either of Dr. O'Shaughnessy or Mr. Laidlay.

Both gentlemen having acceded to the requests addressed to them respectively, it was ordered accordingly.

(Signed) JAMES WM. COLVILLE,  
*President, Asiatic Society.*

*Asiatic Society's Museum, the 4th June, 1849.*

The proceedings of the May meeting were read and confirmed, and the accounts and vouchers of the preceding month were laid upon the table.

The following gentlemen, proposed as members at the previous meeting, were balloted for and duly elected.

C. Beadon, Esq. C. S.

Dr. Rowe, Superintending Surgeon, Dacca.

R. V. Thurburn, Esq.

Robert Cathcart Dalrymple Bruce, Esq. H. M.—Regt. was proposed as a member by the Hon'ble Sir J. W. Colvile, seconded by Mr. Walker.

Read letters

From W. Seton Karr, Esq. Under Secretary to the Government of Bengal, forwarding two original letters with enclosures from Capt. Ellis, Political Agent in Bundlecund, requesting queries contained therein to be filled up.

Ordered to be referred to the Oriental Section.

From R. Thornton, Esq. Assistant Secretary to the Government, North Western Provinces, forwarding a note on the transport of coal from Sonadah to Bombay by the Nurbudda.

From H. M. Elliot, Esq. Secretary to the Government of India, presenting a copy of his Supplemental Glossary.

From Dr. Campbell, Superintendant of Darjiling, journal of a Trip to Sikim.

Read extracts from a paper by B. H. Hodgson, Esq., on the Aborigines of North-Eastern India.

Read the following letter from Dr. Roer, Secretary to the Oriental Section :—

*To J. W. LAIDLAY, Esq. Vice-President and Secretary to the Asiatic Society.*

*Dated Asiatic Society, the 4th June, 1849.*

SIR,—In reply to your letter of the 9th ult., I have the honour, by direction of the Oriental Section, to state for the information of the Society, that the Section have unanimously agreed to your proposal to print the *Lalita Vistara* in the *Bibliotheca Indica*, and to recommend that the copy of the *Tarikh i Abu Sayed*, purchased by the Librarian at the sale of the Scinde property for Co.'s Rs. 33, should be taken at that price by the Society.

2. I am also directed to submit a copy of the *Kádambari*, with a letter from Pandit Madan Mohan Tarkálankár, requesting the patronage of the Society for his edition of that work, price per copy Co.'s Rs. 3, and to propose for the approval of the Society the purchase of 20 copies.

3. I forward a list of the accompanying Sanskrit books lately published in Calcutta, which the Section suggest to be purchased for the Library of the Society.

4. The MS. of the *Lalita Vistara* and the copy of the *Tarikh i Abu Sayed* are herewith returned.

I have the honor to be, Sir,

Your most obedient servant,

E. ROER, *Secy. Or. Sect. As. Soc.*

|                              |     |       |   |   |
|------------------------------|-----|-------|---|---|
| Dhátupáṭha,.....             | Rs. | 1     | 0 | 0 |
| Paribhāshá,.....             |     | 1     | 0 | 0 |
| Shabda Sakti prakāsiká,..... |     | 2     | 0 | 0 |
| Khandana Khanda Khādyam, ..  |     | 3     | 0 | 0 |
| Anumāna dídhiti, .....       |     | 2     | 0 | 0 |
| Anumāna Khanda,.....         |     | 1     | 8 | 0 |
| Tatwa Kaumudí,.....          |     | 1     | 0 | 0 |
| Kusumánjalí, .....           |     | 1     | 0 | 0 |
|                              |     | <hr/> |   |   |
|                              |     | 12    | 8 | 0 |

Ordered that 5 copies of the Kádambarí be purchased by the Society, and the other suggestions contained in the above letter be sanctioned.

Read a letter from Lieut. Staples, presenting in the name of Dr. Henderson, a Hybrid Dog.

From Monsieur P. W. B. de Wilde, Librarian of the Society of Arts and Sciences at Batavia, enclosing a list of books, and requesting the assistance of the Asiatic Society in procuring these at the expense of the Batavian Society. Ordered that so much of the Asiatic Researches as are in the possession of the Asiatic Society be presented to the Batavian Society, and that the librarian be directed to purchase on their account the remainder which are not published by the Society.

From Monsieur Gibelin, Procureur General at Pondicherry, presenting the second Vol. of his Etudes sur le Droit Civil des Hindous.

From Mr. Piddington, bringing to the notice of the Society, a paragraph in the Bibliotheque Universelle de Geneve for December, 1848, page 456, respecting Monsieur Csoma de Koros. Ordered that the Meeting do not think it necessary that the Society should take any notice of the paragraph in question.

For all the above communications and donations, the thanks of the Society were voted and the meeting adjourned.

Confirmed, J. W. COLVILE, *President*.

#### LIBRARY.

The following books have been received since the last meeting :—

#### *Presented.*

Vrihadáranyakam, Kathakam, Iça, Kena, Mundakam oder funf Upanishads aus dem Yajur Sáma und Athurva-Veda. Nach den Handschriften der Biblio-

thek der Ost-Indischen Compagnie zu London, herausgegeben von L. Poley. Bonn, 1844, 8vo.—PRESENTED BY THE EDITOR.

Journal of the Indian Archipelago and Eastern Asia, Vol. III. Nos. IV. and V.—BY THE EDITOR.

Ditto ditto. Vol. III. Nos. III.—IV. (two copies).—BY THE GOVERNMENT OF BENGAL.

The Calcutta Christian Observer for June, 1849.—BY THE EDITORS.

The Oriental Baptist, No. 30.—BY THE EDITOR.

Upadesaka, No. 30.—BY THE EDITOR.

Meteorological Register kept at the Surveyor General's Office, for the month of April, 1849.—BY THE DEPUTY SURVEYOR GENERAL.

Tatwabodhini Patriká.—BY THE TATWABODHINI' SABHA'.

The Quarterly Journal of the Geological Society, No 16.—BY THE SOCIETY.

Lois des Tempêtes ou Guide du Navigateur. Traduit de l'ouvrage de M. H. Piddington, The Sailor's Horn-book for the Law of Storms, augmenté de notes par H. Bousquet. Maurice, 1849, 8vo.—BY THE TRANSLATOR.

The Oriental Christian Spectator for April, 1849.—BY THE EDITOR.

Mortality in the Jails of the 24-Pergunnahs, Calcutta, by Lieut.-Col. Sykes.—BY THE AUTHOR, through H. M. Elliot, Esq., Secretary to the Government of India.

Vital Statistics of a district in Java, by Lieut.-Col. W. H. Sykes.—BY THE SAME.

Statistics of Civil Justice in Bengal, by Lieut.-Col. W. H. Sykes.—BY THE SAME.

*Exchanged.*

The Athenæum, Nos. 1114-15-16-18-19.

The London, Edinburgh and Dublin Philosophical Magazine, No. 224.

Journal Asiatique, Nos. 56-8.

The Picnic Magazine, No. 13.

*Purchased.*

Comptes Rendus, Nos. 3 @ 9.

The Annals and Magazine of Natural History, No. 15.

Journal des Savants for December, 1848.



# Meteorological Register kept at the Surveyor General's Office, Calcutta, for the Month of June, 1849.

Lat. 22° 33' 28". 33 N. Long. 88° 23' 42". 84 East. Mag. Variation 2° 28' 36" East. Mag. Dip. 27° 45'.

| Day of the Month. | Observations made at sunrise.        |                 |             |              |           | Maximum Pressure observed at 9h. 50m. |                                      |                 |             |              | Observations made at apparent noon. |                    |                                      |                 |             | Observations made at 2h. 40m. |          |                    |                                      |                 | Minimum Pressure observed at 4 p. m. |              |          |                    |          | Observations made at sunset. |          |          |                 |                   | Maximum and Minimum Thermometer. |                 |             | Rain Gauges. |        | Days of the month. |
|-------------------|--------------------------------------|-----------------|-------------|--------------|-----------|---------------------------------------|--------------------------------------|-----------------|-------------|--------------|-------------------------------------|--------------------|--------------------------------------|-----------------|-------------|-------------------------------|----------|--------------------|--------------------------------------|-----------------|--------------------------------------|--------------|----------|--------------------|----------|------------------------------|----------|----------|-----------------|-------------------|----------------------------------|-----------------|-------------|--------------|--------|--------------------|
|                   | Barometer reduced to 32° Fahrenheit. | Temperature.    |             |              | Wind.     | Aspect of the Sky.                    | Barometer reduced to 32° Fahrenheit. | Temperature.    |             |              | Wind.                               | Aspect of the Sky. | Barometer reduced to 32° Fahrenheit. | Temperature.    |             |                               | Wind.    | Aspect of the Sky. | Barometer reduced to 32° Fahrenheit. | Temperature.    |                                      |              | Wind.    | Aspect of the Sky. | Maximum. | Mean.                        | Minimum. | Maximum. | Elevations.     |                   |                                  |                 |             |              |        |                    |
|                   |                                      | Of the Mercury. | Of the Air. | Of Wet Bulb. |           |                                       |                                      | Of the Mercury. | Of the Air. | Of Wet Bulb. |                                     |                    |                                      | Of the Mercury. | Of the Air. | Of Wet Bulb.                  |          |                    |                                      | Of the Mercury. | Of the Air.                          | Of Wet Bulb. |          |                    |          |                              |          |          | Of the Mercury. | Of the Air.       | Of Wet Bulb.                     | Of the Mercury. | Of the Air. | Of Wet Bulb. | Upper. |  | Lower. |
| 1                 | 29.593                               | 82.3            | 83.0        | 79.8         | S.        | Cirrus cumuli.                        | 29.642                               | 92.3            | 90.6        | 81.1         | S. S. W.                            | Cumulo strat.      | 29.545                               | 99.0            | 96.7        | 82.2                          | S. S. E. | Cumulo strat.      | 29.541                               | 99.2            | 95.9                                 | 81.2         | E. S. E. | Cumulo strat.      | 29.540   | 92.3                         | 91.2     | 80.7     | S. S. E.        | Cumulo strat.     | 99.8                             | 91.5            | 83.2        | 117.6        | 0.12   | 1                  |
| 2                 | 29.554                               | 82.5            | 83.1        | 80.0         | S. E.     | Cloudy.                               | 29.695                               | 91.3            | 89.6        | 83.0         | S. S. E.                            | Ditto              | 29.571                               | 97.3            | 95.0        | 82.4                          | E. S. E. | Ditto              | 29.542                               | 97.0            | 94.7                                 | 81.7         | S.       | Cloudy.            | 29.540   | 92.0                         | 91.0     | 80.9     | S. S. E.        | Cloudy.           | 99.8                             | 90.2            | 83.0        | 117.1        | 0.06   | 2                  |
| 3                 | 29.536                               | 82.8            | 81.0        | 79.4         | E.        | Clear.                                | 29.666                               | 91.9            | 89.0        | 81.0         | E. S. E.                            | Ditto              | 29.551                               | 95.5            | 92.9        | 81.8                          | E. S. E. | Ditto              | 29.543                               | 91.9            | 89.1                                 | 81.8         | E. S. E. | Cloudy.            | 29.540   | 92.0                         | 91.0     | 80.8     | S. S. W.        | Cloudy.           | 99.8                             | 88.4            | 81.3        | 111.8        | 0.11   | 3                  |
| 4                 | 29.589                               | 80.8            | 82.3        | 80.3         | S. S. W.  | Cumuli.                               | 29.618                               | 90.2            | 88.7        | 82.0         | S. W.                               | Cloudy.            | 29.563                               | 92.0            | 91.0        | 83.8                          | S. W.    | Clear.             | 29.533                               | 95.0            | 93.8                                 | 81.0         | S. W.    | Cirrus.            | 29.540   | 81.0                         | 78.3     | 75.8     | S. W.           | Rainy.            | 99.9                             | 87.0            | 78.0        | 106.7        | 0.32   | 4                  |
| 5                 | 29.535                               | 83.3            | 84.0        | 80.0         | S. sharp. | Cirrus.                               | 29.663                               | 90.3            | 90.3        | 83.2         | S. S. W.                            | Cumuli.            | 29.591                               | 95.1            | 94.1        | 81.0                          | S.       | Cumuli.            | 29.567                               | 90.6            | 90.2                                 | 83.0         | S. E.    | Cloudy.            | 29.540   | 90.6                         | 90.2     | 83.0     | S. E.           | Cloudy.           | 99.9                             | 87.3            | 71.6        | 107.2        | 0.10   | 5                  |
| 6                 | 29.619                               | 81.2            | 77.6        | 74.6         | W. S. W.  | Cloudy.                               | 29.663                               | 84.0            | 85.9        | 79.9         | E. N. E.                            | Clear.             | 29.578                               | 96.8            | 95.6        | 81.5                          | S.       | Cumulo strat.      | 29.564                               | 94.4            | 93.0                                 | 83.8         | S.       | Ditto              | 29.540   | 88.1                         | 88.4     | 77.2     | S. S. E.        | Ditto             | 99.1                             | 87.5            | 77.8        | 113.5        | 0.14   | 6                  |
| 7                 | 29.605                               | 79.2            | 79.8        | 73.8         | S. S. E.  | Cirrus cumuli.                        | 29.617                               | 88.0            | 86.2        | 77.0         | N. E.                               | Cirrus cumuli.     | 29.587                               | 92.9            | 91.0        | 78.8                          | N. W.    | Cirrus cumuli.     | 29.526                               | 96.3            | 91.5                                 | 83.2         | W. S. W. | Ditto              | 29.540   | 90.5                         | 89.3     | 77.1     | S. W.           | Scattered clouds  | 99.0                             | 83.5            | 80.0        | 117.4        | 1.10   | 7                  |
| 8                 | 29.609                               | 75.8            | 76.6        | 75.0         | N. W.     | Rainy.                                | 29.621                               | 78.2            | 78.1        | 76.5         | N. W.                               | Droily.            | 29.592                               | 86.3            | 85.1        | 80.0                          | N. N. E. | Cloudy.            | 29.518                               | 85.6            | 85.3                                 | 78.7         | N.       | Cumulo strat.      | 29.519   | 85.7                         | 81.1     | 79.8     | S. S. E.        | Cirrus strat.     | 99.3                             | 81.1            | 75.9        | 98.2         | 0.22   | 8                  |
| 9                 | 29.542                               | 80.0            | 80.6        | 80.6         | N. W.     | Cirrus cumuli.                        | 29.581                               | 90.6            | 84.8        | 81.0         | N. N. W.                            | Cumulo strat.      | 29.541                               | 91.8            | 89.1        | 81.5                          | N. N. E. | Cumulo strat.      | 29.500                               | 90.3            | 88.4                                 | 82.5         | N. E.    | Cumulo strat.      | 29.501   | 85.7                         | 85.0     | 79.3     | E. S. E.        | Ditto             | 99.4                             | 80.8            | 83.7        | 106.8        | 0.30   | 9                  |
| 10                | 29.510                               | 80.2            | 80.9        | 79.2         | N. E.     | Ditto                                 | 29.594                               | 81.2            | 83.7        | 79.8         | L. N. E.                            | Cloudy.            | 29.598                               | 85.3            | 81.5        | 79.7                          | E. N. E. | Cloudy.            | 29.525                               | 87.0            | 85.8                                 | 80.3         | N. E.    | Cloudy.            | 29.524   | 84.8                         | 84.0     | 79.1     | E. S. E.        | Cirrus cumuli.    | 99.5                             | 84.1            | 80.9        | 97.2         | 0.11   | 10                 |
| 11                | 29.511                               | 78.7            | 78.3        | 78.0         | S. S. E.  | Cirrus strat.                         | 29.606                               | 91.3            | 89.0        | 81.6         | W. N. W.                            | Cumuli.            | 29.581                               | 93.9            | 92.2        | 82.4                          | S. W.    | Cumulo strat.      | 29.510                               | 91.0            | 90.2                                 | 82.3         | W. N. W. | Cumulo strat.      | 29.516   | 91.4                         | 89.4     | 82.7     | S. E.           | Cloudy.           | 99.6                             | 88.6            | 79.6        | 119.5        | 0.11   | 11                 |
| 12                | 29.518                               | 79.4            | 80.4        | 78.8         | S. S. E.  | Cloudy.                               | 29.601                               | 89.8            | 89.2        | 82.5         | S. S. W.                            | Cirrus cumuli.     | 29.519                               | 94.2            | 93.2        | 83.1                          | S. S. W. | Cirrus strat.      | 29.479                               | 93.1            | 91.7                                 | 83.0         | S. S. W. | Cloudy.            | 29.493   | 81.0                         | 81.0     | 82.2     | S. sharp.       | Cloudy to N.      | 99.0                             | 88.1            | 80.2        | 109.1        | 0.08   | 12                 |
| 13                | 29.541                               | 84.3            | 83.3        | 80.4         | S. S. W.  | Ditto                                 | 29.565                               | 92.1            | 91.3        | 83.5         | S. S. W.                            | Ditto              | 29.531                               | 91.1            | 93.3        | 81.1                          | S. S. W. | Cumuli.            | 29.481                               | 95.3            | 94.2                                 | 84.5         | S.       | Cumulo strat.      | 29.458   | 90.2                         | 89.1     | 82.3     | S. S. E.        | Clear.            | 99.0                             | 84.1            | 80.2        | 101.7        | 0.14   | 13                 |
| 14                | 29.525                               | 81.2            | 83.7        | 80.1         | S.        | Cirrus cumuli.                        | 29.551                               | 93.0            | 91.9        | 81.9         | S.                                  | Clear.             | 29.535                               | 95.3            | 94.7        | 84.5                          | S. W.    | Clear.             | 29.475                               | 94.0            | 92.2                                 | 81.4         | S. E.    | Ditto              | 29.490   | 90.4                         | 89.8     | 80.6     | S. S. E.        | Cloudy N. W.      | 99.0                             | 91.5            | 81.0        | 110.2        | 0.11   | 14                 |
| 15                | 29.581                               | 82.2            | 82.4        | 80.0         | S. S. E.  | Cirrus strat.                         | 29.646                               | 90.2            | 89.6        | 82.1         | S. S. E.                            | Cumulo strat.      | 29.617                               | 94.7            | 92.9        | 81.2                          | S.       | Cumulo strat.      | 29.563                               | 92.3            | 84.9                                 | 80.6         | S. S. W. | Cloudy.            | 29.591   | 83.7                         | 83.1     | 80.5     | S. W.           | Cloudy.           | 99.0                             | 88.0            | 78.9        | 116.0        | 0.42   | 15                 |
| 16                | 29.590                               | 80.8            | 81.3        | 79.4         | E. S. E.  | Ditto                                 | 29.631                               | 92.7            | 90.3        | 82.3         | E.                                  | Ditto              | 29.604                               | 85.8            | 85.9        | 80.9                          | S. S. E. | Nimbi.             | 29.546                               | 84.3            | 83.3                                 | 80.4         | S. E.    | Ditto              | 29.519   | 83.0                         | 82.4     | 79.7     | S. E.           | Cloudy.           | 99.0                             | 86.1            | 81.4        | 97.0         | 0.18   | 16                 |
| 17                | 29.582                               | 80.0            | 80.7        | 79.0         | E.        | Cloudy.                               | 29.611                               | 91.3            | 87.8        | 81.8         | E.                                  | Nimbi.             | 29.544                               | 89.6            | 84.9        | 81.3                          | E. S. E. | Rainy.             | 29.529                               | 82.3            | 81.7                                 | 79.2         | S. E.    | Rainy.             | 29.527   | 83.3                         | 83.2     | 81.2     | S. S. E.        | Ditto             | 99.0                             | 85.2            | 80.5        | 101.1        | 0.06   | 17                 |
| 18                | 29.596                               | 79.6            | 80.0        | 78.6         | E.        | Droily.                               | 29.611                               | 82.0            | 81.8        | 80.0         | E.                                  | Droily.            | 29.600                               | 81.0            | 83.3        | 81.0                          | S. S. E. | Cloudy.            | 29.524                               | 89.3            | 86.3                                 | 81.3         | S. E.    | Cloudy.            | 29.529   | 83.2                         | 81.4     | 79.7     | S. E.           | Ditto             | 99.0                             | 81.0            | 80.0        | 101.1        | 0.86   | 18                 |
| 19                | 29.511                               | 78.8            | 79.3        | 78.2         | E. S. E.  | Cloudy.                               | 29.552                               | 84.9            | 86.4        | 81.8         | S. E.                               | Ditto              | 29.585                               | 87.0            | 84.0        | 81.4                          | S. E.    | Rainy.             | 29.513                               | 88.0            | 87.7                                 | 83.0         | S.       | Nimbi.             | 29.497   | 86.7                         | 86.0     | 82.3     | S. W.           | Cumulo strat.     | 99.3                             | 85.1            | 78.9        | 101.1        | 0.86   | 19                 |
| 20                | 29.517                               | 80.6            | 80.9        | 79.9         | S. E.     | Cirrus strat.                         | 29.528                               | 89.1            | 88.3        | 82.8         | S. S. E.                            | Cumulo strat.      | 29.491                               | 93.5            | 91.5        | 83.0                          | S. E.    | Cumulo strat.      | 29.426                               | 87.0            | 85.1                                 | 80.8         | S. E.    | Cloudy.            | 29.410   | 86.7                         | 86.3     | 81.1     | S. E.           | Cloudy.           | 99.9                             | 87.0            | 81.0        | 110.0        | 0.11   | 20                 |
| 21                | 29.243                               | 80.0            | 80.8        | 79.2         | N.        | Cloudy.                               | 29.588                               | 85.6            | 85.6        | 82.4         | N. N. W.                            | Cumulo strat.      | 29.521                               | 91.3            | 89.8        | 83.6                          | N. W.    | Ditto              | 29.424                               | 79.9            | 81.0                                 | 79.1         | S. W.    | Rainy.             | 29.423   | 79.5                         | 80.0     | 77.6     | S. W.           | Cloudy.           | 99.8                             | 81.2            | 80.5        | 101.1        | 1.18   | 21                 |
| 22                | 29.494                               | 79.2            | 79.5        | 76.1         | S. sharp. | Droily.                               | 29.587                               | 82.3            | 83.7        | 80.2         | S. sharp.                           | Nimbi.             | 29.571                               | 88.0            | 87.1        | 81.1                          | S. S. W. | Nimbi.             | 29.558                               | 81.7            | 85.3                                 | 81.4         | S. S. W. | Droily.            | 29.554   | 81.3                         | 81.0     | 81.3     | S.              | Very cloudy.      | 99.3                             | 87.3            | 80.8        | 115.8        | 1.50   | 22                 |
| 23                | 29.688                               | 80.8            | 81.2        | 79.0         | S.        | Cirrus cumuli.                        | 29.422                               | 85.8            | 85.0        | 80.3         | S. S. W.                            | Ditto              | 29.699                               | 90.5            | 89.8        | 81.9                          | S. S. W. | Cumulo strat.      | 29.613                               | 89.0            | 88.2                                 | 82.3         | S. W.    | Cumulo strat.      | 29.644   | 81.7                         | 81.8     | 80.3     | S.              | Scattered clouds. | 99.3                             | 86.3            | 81.3        | 102.7        | 0.11   | 23                 |
| 24                | 29.633                               | 82.2            | 83.0        | 80.2         | S. W.     | Cloudy.                               | 29.660                               | 84.5            | 85.0        | 84.1         | S. W.                               | Cumulo strat.      | 29.571                               | 90.5            | 89.7        | 82.9                          | S. W.    | Ditto              | 29.551                               | 90.6            | 90.0                                 | 83.1         | S. S. W. | Ditto              | 29.562   | 89.2                         | 79.8     | 76.9     | S. W.           | Droily.           | 99.8                             | 87.4            | 83.0        | 99.8         | 0.22   | 24                 |
| 25                | 29.551                               | 81.9            | 82.8        | 80.0         | S. W.     | Ditto                                 | 29.599                               | 84.1            | 81.9        | 82.8         | S. S. W.                            | Ditto              | 29.559                               | 92.8            | 91.8        | 84.0                          | S. W.    | Ditto              | 29.487                               | 92.2            | 91.3                                 | 85.0         | S.       | Nimbi.             | 29.475   | 80.2                         | 79.5     | 76.0     | N. N. W.        | Cloudy & Tau.     | 99.0                             | 87.2            | 79.1        | 104.0        | 0.84   | 25                 |
| 26                | 29.493                               | 81.8            | 82.1        | 80.8         | S. S. W.  | Ditto                                 | 29.508                               | 90.8            | 90.0        | 82.8         | S. W.                               | Cloudy.            | 29.438                               | 90.8            | 89.8        | 83.0                          | S. W.    | Cumuli.            | 29.419                               | 91.1            | 90.0                                 | 82.8         | S. S. W. | Cumuli.            | 29.496   | 76.8                         | 77.4     | 76.0     | W. N. W.        | Rain & Thunder    | 99.5                             | 85.2            | 78.9        | 100.1        | 2.96   | 26                 |
| 27                | 29.492                               | 71.2            | 78.0        | 77.2         | S.        | Rainy.                                | 29.528                               | 80.0            | 80.3        | 79.0         | S. W.                               | Rainy.             | 29.513                               | 78.2            | 77.8        | 76.9                          | E. S. E. | Rainy.             | 29.437                               | 81.0            | 81.3                                 | 79.6         | S. W.    | Cloudy.            | 29.438   | 83.2                         | 83.3     | 80.1     | S. W.           | Cloudy.           | 99.1                             | 80.5            | 76.2        | 90.6         | 0.24   | 27                 |
| 28                | 29.473                               | 80.0            | 80.0        | 80.0         | .....     | .....                                 | 29.473                               | 83.8            | 87.5        | 81.0         | N. W.                               | Cloudy.            | 29.437                               | 81.0            | 81.3        | 79.6                          | S. W.    | Cloudy.            | 29.438                               | 83.2            | 83.3                                 | 80.1         | S. W.    | Cloudy.            | 29.438   | 83.2                         | 83.3     | 80.1     | S. W.           | Cloudy.           | 99.1                             | 81.8            | 76.0        | 90.6         | 0.24   | 28                 |
| 29                | 29.529                               | 80.1            | 81.0        | 79.0         | .....     | .....                                 | 29.529                               | 80.1            | 81.0        | 79.0         | .....                               | .....              | 29.529                               | 80.1            | 81.0        | 79.0                          | .....    | .....              | 29.529                               | 80.1            | 81.0                                 | 79.0         | .....    | .....              | 29.529   | 80.1                         | 81.0     | 79.0     | .....           | .....             | 99.5                             | 85.8            | 80.0        | 101.5        | 12.94  | 29                 |
| 30                | 29.529                               | 80.1            | 81.0        | 79.0         | .....     | .....                                 | 29.529                               | 80.1            | 81.0        | 79.0         | .....                               | .....              | 29.529                               | 80.1            | 81.0        | 79.0                          | .....    | .....              | 29.529                               | 80.1            | 81.0                                 | 79.0         | .....    | .....              | 29.529   | 80.1                         | 81.0     | 79.0     | .....           | .....             | 99.5                             | 85.8            | 80.0        | 101.5        | 12.94  | 30                 |

These Observations have been made for the most part, with a supply of new and first rate Instruments received into the Observatory, by orders of the Bengal Government, in brief description of the Instruments seems necessary.

1st.—The Barometer is a standard Instrument by Newson, diameter of the tube 11.921 inches. The following is the comparative showing of this Instrument and those Barometers which were in use at the Observatory prior to 1st of June, 1844.

2nd.—The Thermometer is a Standard Instrument by Newson, on metal Scale and graduated to 1/4 of a degree.

3rd.—Wet Bulb Hygrometer by Newson, graduated to single degree division, the difference between Standard Thermometer and dry Thermometer of this Instrument is + 0.2 the Temperature of the dry Bulb is taken from the Standard Thermometer, and in the event of the quantity, moisture, dew point, or dryness, being required, it is necessary the difference indicated to be taken into calculation.

4th.—Maximum and Minimum Thermometer by Newson. The difference between these instruments, and the Standard Thermometer is + 0.7 for the former and 0.23 for the latter.

5th.—The Temperature shown in Column II of a Thermometer, in sun's rays, is acquired by means of a Newson's Maximum Thermometer having a black bulb.—The above Instruments, excepting the Thermometer placed in the sun's rays, are fixed at above 4 1/2 feet from the ground, to a post, in a thickly shopped house, and are freely exposed to the air and sheltered from any influence of Solar reflection.

The height of the Surface of the Mercury in the Cistern of the Standard Barometer at the Observatory attached to the Surveyor General's Office above the Mean Level of the Sea, having been deduced from a Series of Tide Observations taken from a Register kept at Kyd's Dock Yard, the result is recorded for general information.

Lowest Monthly Average of Mean Tides in the Months of February and March, above the Zero of Gauge at Kyd's Dock Yard, Calcutta, ..... 8.38  
 Difference of Level between the Zero of Tide Gauge at Kyd's Dock Yard, and the Standard Barometer of the Observatory, ..... 26.59  
 Height of Standard Barometer









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